Gallenkamp

16th Edition

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SIXTEENTH EDITION GENERAL CATALOGUE

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Areas and telephones, see page 9. OVERSEAS, SEE PAGES 10 & 11

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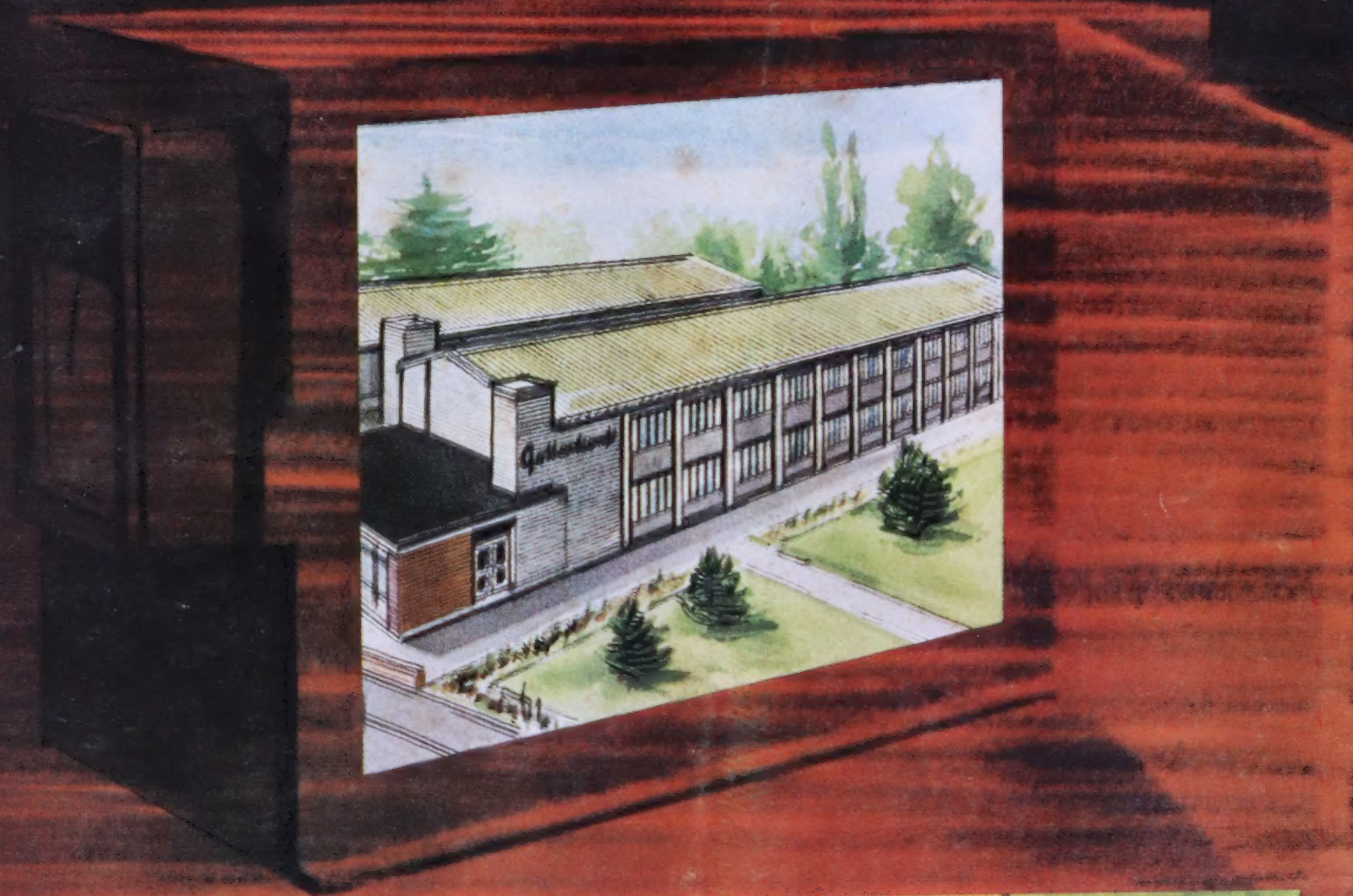
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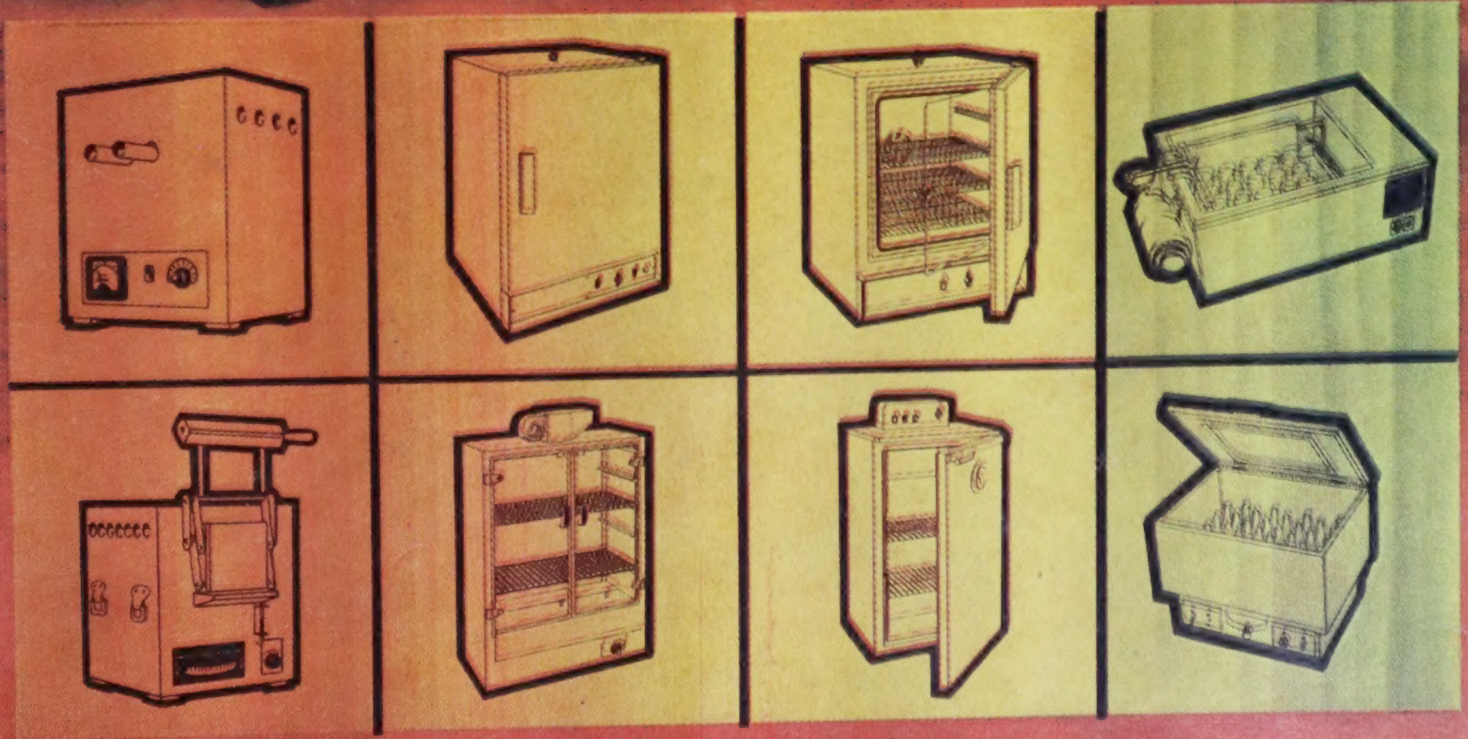

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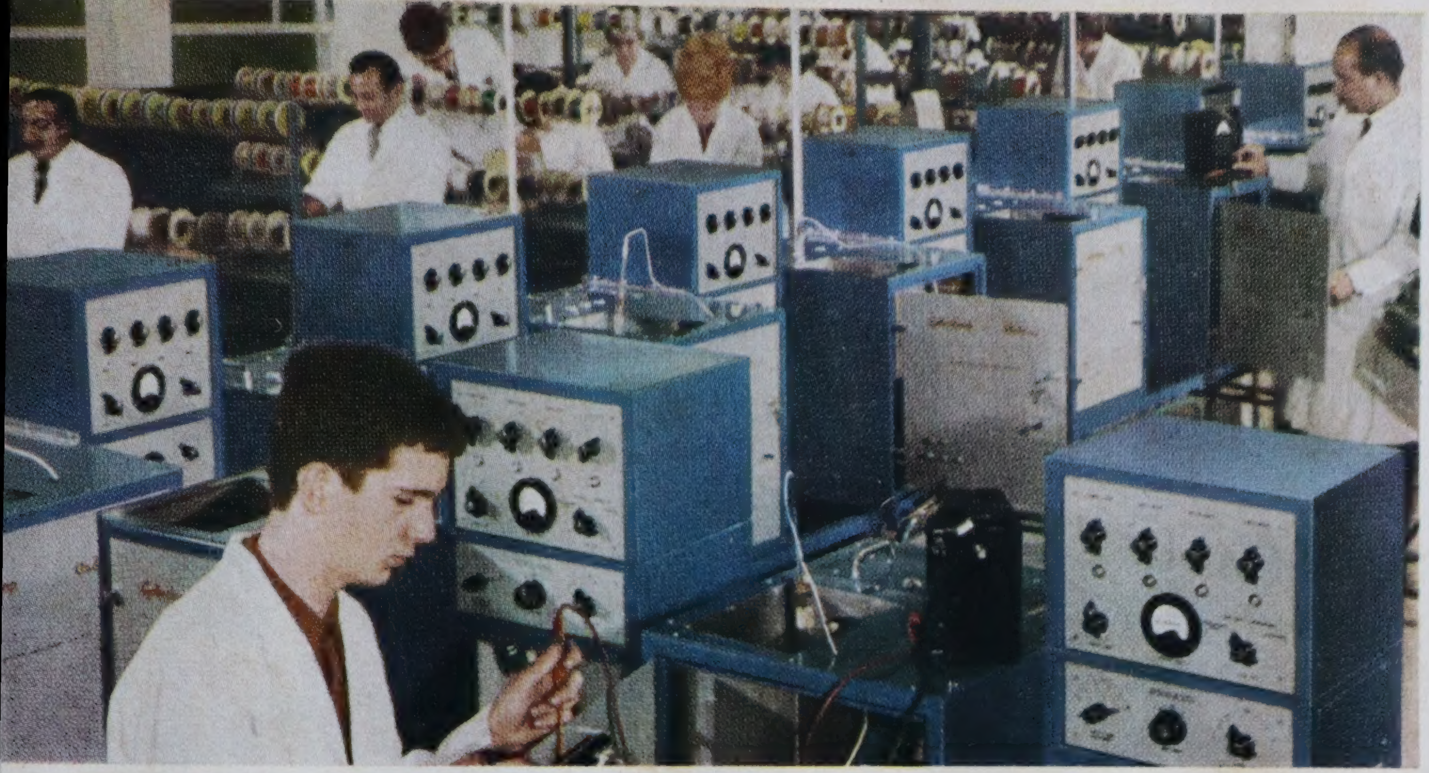

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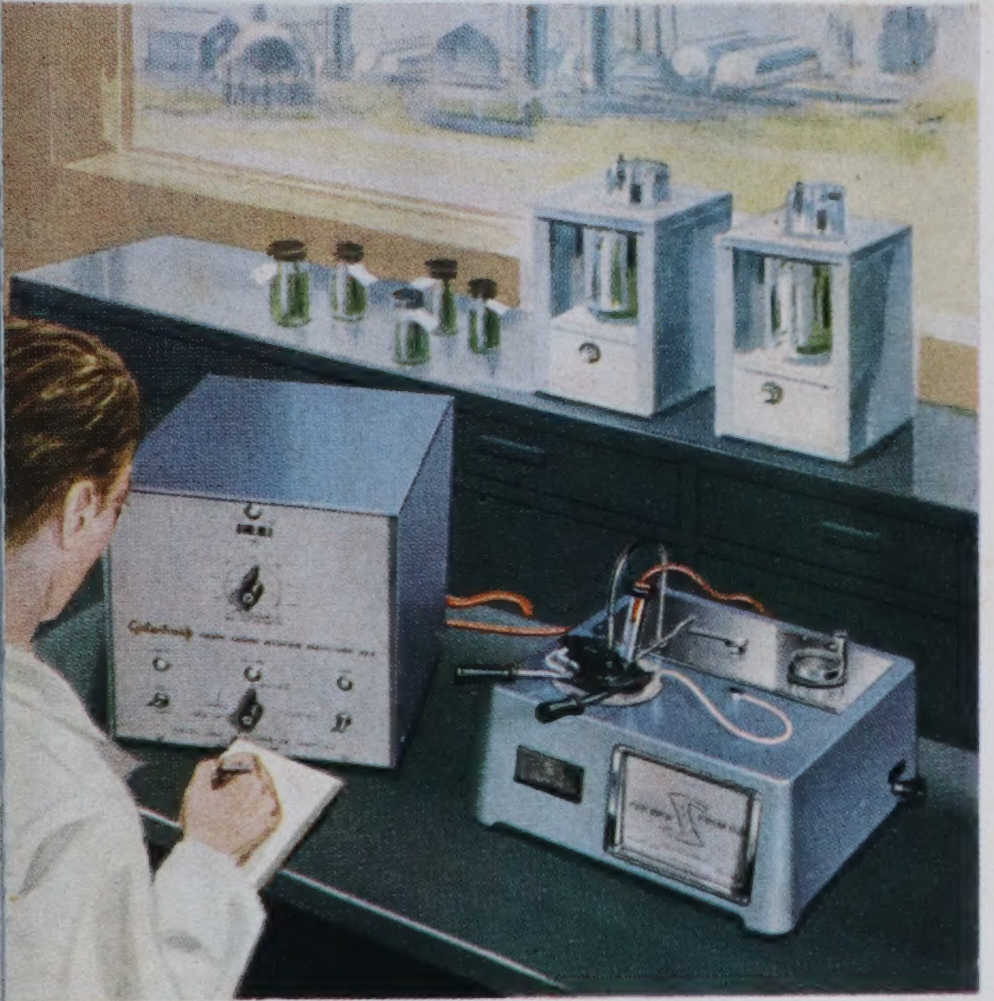
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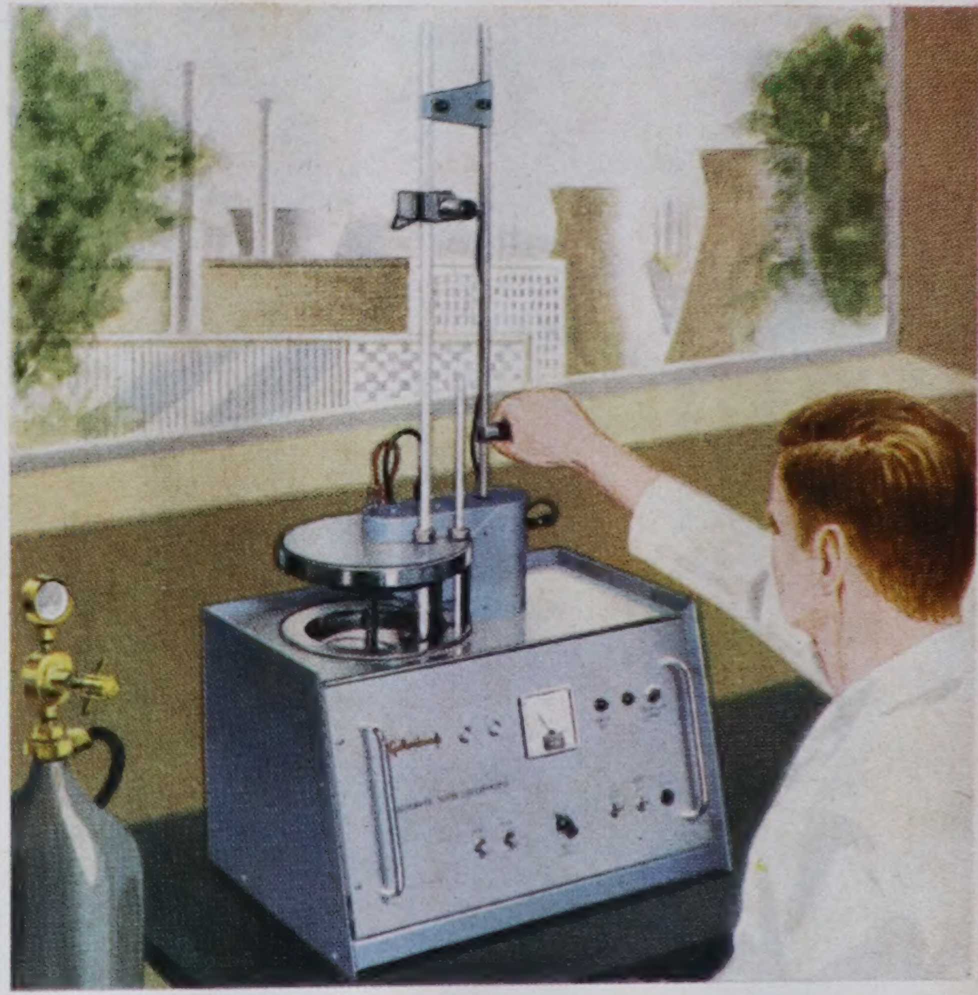
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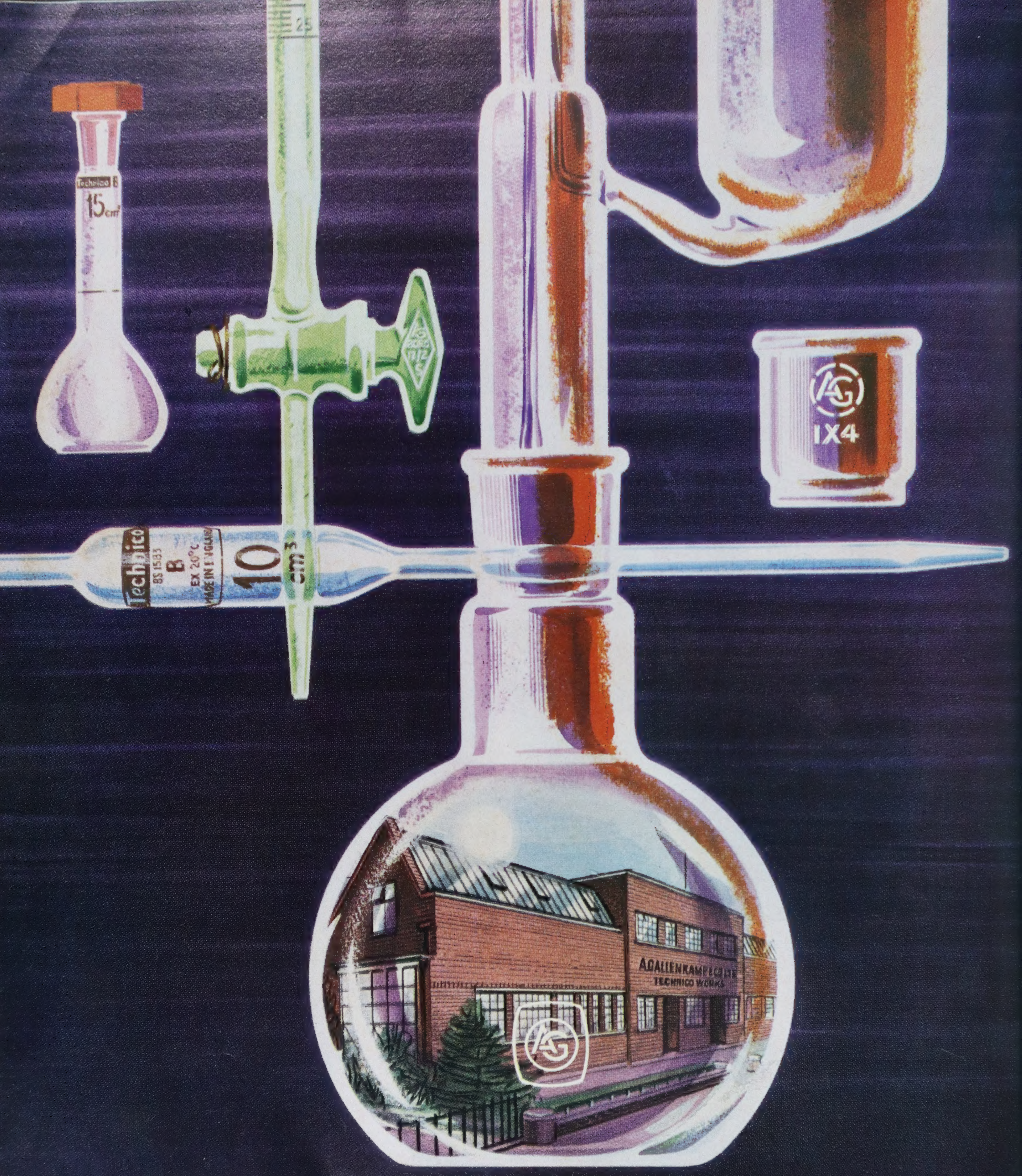
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INTRODUCTION

LAYOUT

This edition, following closely the pattern set by our two previous catalogues which proved both popular and convenient in use, incorporates a number of improvements:

- Revised layout of headings provides a clear index letter at the top corner of each page to facilitate use of the alphabetical sequence.
- Clarification of the coding system enables the user more readily to recognise those goods which are normally available for delivery from stock.
- Individual listing clearly indicates standard available voltage ranges of all major electrical apparatus.
- An increased number of cross references reminds users of associated apparatus and minimises the need to refer to the index.
- The augmented index facilitates the location of obscure items and those having more than one name or description.

MAIN AND CROSS-REFERENCE ENTRIES

Every article in the catalogue has one main entry, the position of which determines its list number and under which the full specification and price will be found. Many articles, for various reasons, require entries in several places. In such instances the subsidiary entries show only brief details together with the list number which provides ready reference to the main entry in alphabetical and numerical sequence. This system avoids much unnecessary duplication and minimises the bulk of the catalogue.

NEW PRICE STRUCTURE

On a number of pages appears an explanatory inset which gives the reasons for our adoption of a pricing system which provides, towards the lower end of the price scale, a progressively greater differential in favour of purchase in larger quantities.

We feel confident that our customers will recognise this to be a fair and equitable basis for minimising the disproportionately higher cost of handling low value and small quantity orders.

STOCK CODING

In addition to the clearer presentation mentioned above, we are pleased to report that improved organisation has made possible a considerable increase in the range of items which are normally available for expeditious delivery from stocks held in London, Widnes and Stockton.

ORDERS AND ENQUIRIES

Please include list numbers and any other essential data on all orders and enquiries to avoid the risk of delay and/or incorrect interpretation, and to provide a comparable basis for adjudication of quotations.

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AND
DISTRIBUTION
IN THE
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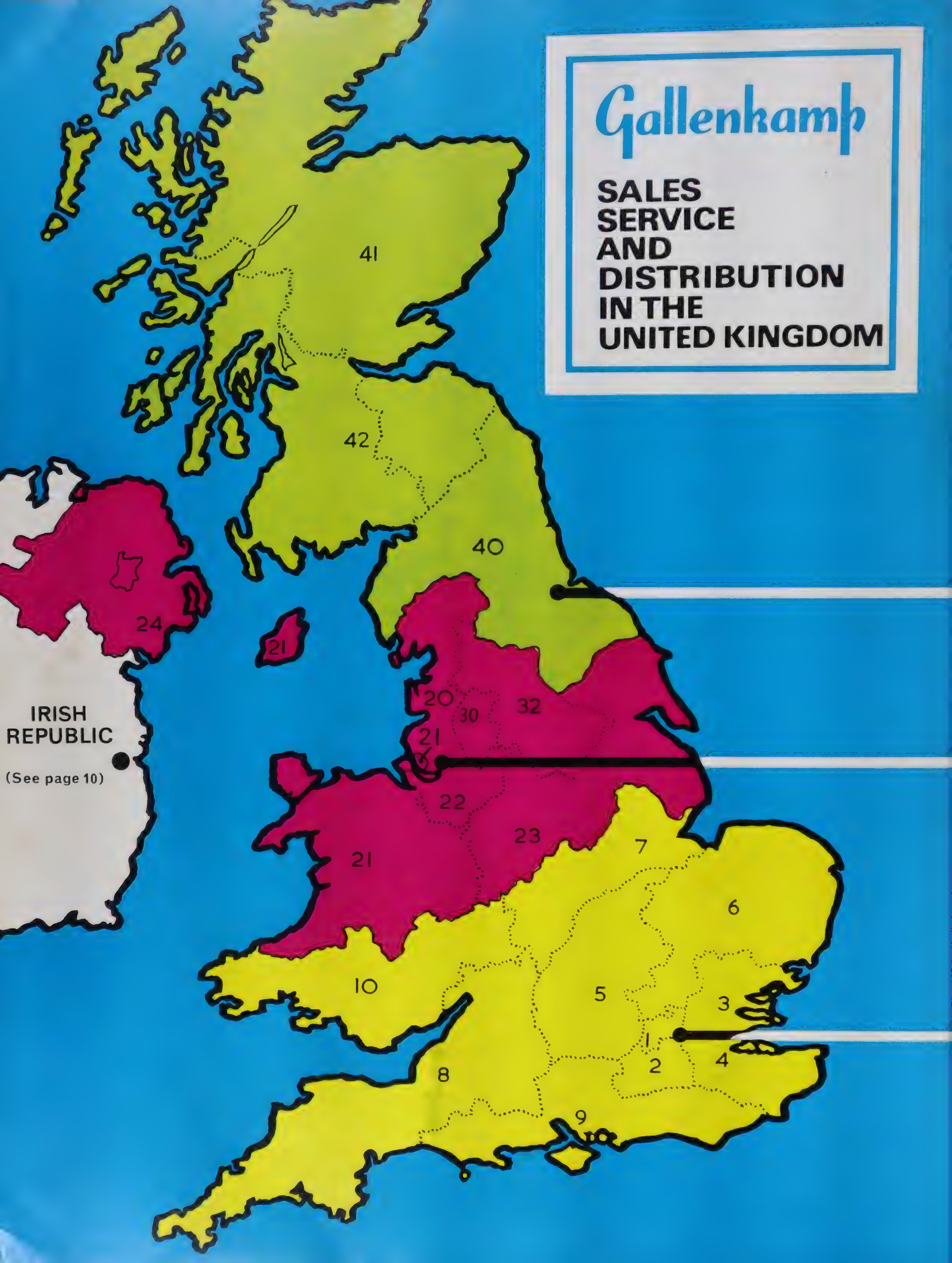
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JAMAICA	Jamaica Scientific House Ltd., 138, King Street, Kingston. Tel. No.: 22617.
MEXICO	Stephen Szekely, Av. Durango No. 199, Mexico 7, D.F. Tel. Nos.: 14-95-66, 14-95-72 and 14-63-24.
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or to our Appointed Distributors overseas (see pages 10 and 11)

CONDITIONS OF SALE

All orders are accepted and goods supplied by us on the following terms and conditions.

SECTION 1.

Applicable to all orders.

1.1. PRICES

All quoted and printed prices are ex works and subject to alteration without notice; we reserve the right to invoice goods at prices ruling at the date of despatch.

1.2. QUANTITY RATES

Many articles are priced with two or more differential rates according to quantity so as to provide a price advantage in favour of the larger quantity. Towards the lower end of the price scale, this differential becomes progressively greater in favour of the larger quantity.

Quantity prices apply only to orders for the specified quantity or more. Standard pack prices apply only to single or multiple packs. All small or broken pack quantities are charged at the higher rate applicable to small quantities.

Discounts based on 'Order value' or 'Quantity' are available in respect of several groups of goods provided the order complies with certain stated conditions. For details see page 14.

1.3. QUOTATIONS & INVOICES

All quotations are subject to confirmation, and we reserve the right to correct any accidental errors or omissions on quotations or invoices. Where all factors governing the price of the goods are under our direct control we will, unless otherwise stated, hold quoted prices firm if an order is received within 30 days from the date of the quotation.

1.4. DELIVERY

Whilst every effort is made to adhere to delivery dates lateness or failure in delivery shall not entitle the Purchaser to cancel any contract or hold up any payment. We shall not be under any liability for any loss, injury or damage caused by or consequent to any delay in delivery or non-delivery from any cause whatsoever. In particular deliveries offered ex stock are subject to the goods being unsold at the date of receipt of the Purchaser's order.

1.5. WARRANTY & RESPONSIBILITY

Subject to the due observance of any installation, operating or maintenance instructions, we warrant that we will replace or repair at our option free of charge any part or parts of goods of our own manufacture proved to our satisfaction to be defective owing to faults in workmanship or materials. In the case of goods not manufactured by us the Purchaser shall be entitled only to such rights as we may be entitled to receive under any guarantee or warranty given to us in respect thereof. This Condition excludes every warranty, condition or liability not herein expressly set out and all liability for every form of consequential damage or loss and damage or loss caused by the negligence of us our servants or agents is hereby expressly excluded; provided that this condition shall only exclude or restrict the liability and remedy mentioned in Section 3 of the Misrepresentation Act 1967 to the extent therein mentioned.

1.6. REPAIRS

We are not responsible for damage to goods sent to us for repair or examination, nor for incidental damage to glass apparatus and delicate instruments in the course of repair. In the event of no order being placed we may charge for time involved in the preliminary examination and the reassembly of any article. Goods returned for repair should be sent carriage paid, and be clearly labelled with the sender's name and address, and at the same time a letter should be sent detailing the work required.

1.7. CATALOGUES, ETC.

Illustrations and descriptions of goods in our catalogues and other literature are correct as far as possible at the time of publication, but as we are constantly revising and improving designs we must reserve the right to supply equipment to our current specifications and designs. The contents and arrangements of all catalogues and other literature published by us are protected by copyright, and may not be reproduced or used in whole or in part without our specific permission.

Goods of foreign manufacture are identified by an asterisk preceding the catalogue number. Prices of such items include customs and other charges unless otherwise specified.

1.8. LAW OF CONTRACT

The contract shall in all respects be construed and take effect in accordance with the laws of England.

CONDITIONS OF SALE

SECTION 2.

Applicable in addition to Section 1 to orders for delivery in the United Kingdom.

2.1. TERMS OF PAYMENT

Prices are strictly nett for prompt monthly payment and no deductions can be allowed. Either a remittance or two approved trade references and a Banker's reference should accompany orders from customers who have no previous account.

2.2. CARRIAGE

Individual orders to the value of £25 or over, with the exception of acids, dangerous chemicals, certain proprietary goods, laboratory furniture and fittings and other bulky items, are delivered free of carriage charge to all parts of England, Scotland, Wales and Northern Ireland; otherwise, and in the excepted cases above, carriage is charged on the invoice. Delivery by our own motor transport is given over most of the country.

2.3. CLAIMS

No claims shall be made upon us for breakage loss or damage in transit except where goods are conveyed by our own transport. Where goods are not conveyed by our own transport all goods shall be at the risk of the Purchaser or its consignee from the time they leave our premises or those of our agents. Both the carriers concerned and ourselves should be advised in writing of breakages within three days of receipt of goods and of non-delivery within 14 days from date of advice of despatch. Any claim for shortages, errors or breakages, loss or damage in transit by our own transport must be notified to us in writing within 3 days of receipt of the goods and any claim for non-delivery by our own transport must be notified within 14 days from the date of advice of despatch. In the event of no such notification being received by us the goods shall be deemed to have been delivered complete and in compliance with the contract requirements.

2.4. CASES AND CONTAINERS

Cases and other containers where chargeable will be invoiced to customers unless returned in good condition and carriage paid to our warehouse within 60 days from receipt. Charges for cases or containers must not be deducted from our account unless a credit note has been issued in respect of same. Contaminated containers are valueless and no credit can be given in respect of them.

2.5. INSURANCE

If requested by the Purchaser or considered necessary by us we will effect insurance against transit risks at the cost of the Purchaser. If we effect insurance we shall be under no liability to take proceedings for recovery of any loss or damage and if we do claim as agents for the Purchaser our responsibility shall be limited to accounting for any amount received by us and we may deduct any reasonable expenses incurred by us.

2.6. SALE OF POISONS

The sale of listed poisons is restricted by the Pharmacy and Poisons Act, 1933, and by the Poison Rules. We supply poisons only to persons requiring them (a) for use for resale in trade or business or (b) for scientific education or research. Poisons in the First Schedule to the Poison Rules are prefixed 'S.1' in our catalogues. For the purchase of these poisons a written order on the Purchaser's official order form is required, signed by the Purchaser, stating his name, address, trade, business or profession, and the purpose for which the poison is required.

SECTION 3.

Applicable in addition to Section 1 to orders for final delivery outside the United Kingdom.

3.1. CHARGES

All cases and other containers, packages, packing materials, delivery to docks, dock dues, port rates and customs entry, F.O.B. delivery charges, freight, insurance and other charges are chargeable to the Purchaser unless expressly specified by us to the contrary. When we submit a quotation or proforma invoice giving additional charges for:

"CASES, PACKING & DELIVERY F.O.B. LONDON
EXCLUDING PORT RATES & CUSTOMS ENTRY"

it should be understood that the figure quoted also excludes Shipping Charges, Bills of Lading and any Consular Invoice or Certificate of Origin which may be required unless we specifically state that costs for these are included.

3.2. IMPORT LICENCES

Where restrictions on import into the country of destination are in force all orders must be accompanied by the number and date of expiry of the import licence.

3.3. TERMS OF PAYMENT

(a) **Orders from Purchasers in the United Kingdom.** Prices are strictly nett for prompt monthly payment and no deductions can be allowed. Either a remittance or two approved trade references and a Banker's reference should accompany orders from customers who have no previous account.

(b) **Orders from Purchasers outside the United Kingdom.** Unless other arrangements are agreed and made in writing in approved cases, payment shall be by an irrevocable letter of credit confirmed by a London Bank. When an order is for a large number of items, the letter of credit should preferably allow for part payments and shipments. All expenses in respect of such payment must be discharged by the Purchaser.

3.4. DELIVERY

When we state a delivery time on our quotation, proforma invoice, acknowledgment of order, etc. it is to be understood that this is the time we estimate within which we can have the goods ready packed for shipment (please refer to Condition 1.4). Where the order requests us to apply for shipping instructions, instructions for delivery must be furnished to us within 60 days from the date of our application. We cannot accept any responsibility for delays in despatch caused through non-availability of shipping space.

3.5. INSURANCE

(a) **Cover.** We can accept no responsibility for the failure to insure goods unless we have specific instructions to insure them, in which case we will insure only for the C.I.F. value, plus 25%, unless other instructions are given.

(b) **Claims.** However the goods were insured, we shall not be obliged to claim in respect of damage or loss. We will, however, when the goods are insured by our own arrangements, if particularly requested to do so, submit a claim to the underwriters for the insured value of the damage or loss. In such cases we will, if requested, supply free replacements to the C.I.F. value of the amount received from the underwriters, less reasonable charges for negotiating the claim, but we will be under no further liability.

3.6. PACKING

We advise Purchasers to leave the packing of goods for export to our discretion. It will assist us if the following information is given when ordering:—

(a) Shipping Mark.
(b) Limits, if any, as to weight and size of packages.
(c) Directions as to route, e.g. by mail or other steamer, or by air.
(d) All information necessary to make Consular declarations.

3.7. DAMAGE OR LOSS IN TRANSIT

No claims shall be made upon us for breakage, loss or damage in transit, and any claim shall be made direct against the persons responsible.

3.8. SHORTAGES OR ERRORS

No claims can be entertained unless notification in writing is despatched to us within 3 days of the receipt of the goods by the Purchaser or consignee.

CONDITIONS OF SALE

SECTION 4.

Discounts available on certain groups of goods.

In order to ensure recognition of these discounts and to facilitate accountancy it is recommended that such orders should be on a separate order sheet from other goods.

ORDER VALUE DISCOUNTS

Discounts based on the value of an order are applicable to certain groups of goods listed below.

Order value discounts apply to one order for one group of goods for delivery to one address in one consignment.

GROUP 1. TECHNICO AND (AG) SCIENTIFIC GLASSWARE

(All goods listed with code letter 'a' following the price.)

Orders of £50 or over, list price value less 2½%
" " £100 " " " " " 5%
" " £200 " " " " " 7½%
" " £400 " " " " " 10%

GROUP 2. QUICKFIT LABORATORY APPARATUS

(All *Quickfit* and *Clearfit* standard joint and general glassware listed with code letter 'm' following the price. The discounts **do not apply** to T.L.C. apparatus on page 139 and items listed with code letter 'f' following the price.)

Orders of £300 or over, list price value less 7½%
" " £600 " " " " " 15%
" " £1250 " " " " " 20%

GROUP 3. ROYAL WORCESTER LABORATORY PORCELAIN

Orders of £25 or over, list price value less 2½%
" " £50 " " " " " 5%
" " £100 " " " " " 7½%
" " £250 " " " " " 10%
" " £500 " " " " " 15%
" " £1000 " " " " " 20%

QUANTITY DISCOUNTS

Discounts based on the quantity of goods on an order are applicable to certain groups of goods listed below.

Quantity discounts in Group 10, Gallenkamp products—apply to individual items on one order for delivery to one address in one consignment.

Quantity discounts in Groups 11 to 13 apply to one order for one group of goods for delivery to one address in one consignment.

GROUP 10. GALLENKAMP APPARATUS AND INSTRUMENTS

(All goods listed with code letters 'b' or 'g' following the price.)
For goods where an **each** price only is listed.

Order for 3 of an item less 2½%
" " 6 " " " 5%
" " 9 " " " 7½%
" " 12 " " " 10%

If a **dozen** price is listed, the discounts will be allowed respectively on 3, 6, 9 and 12 dozen.

If a **gross** price is listed, the discounts will be allowed respectively on 3, 6, 9 and 12 gross.

GROUP 11. PYREX BRAND LABORATORY GLASSWARE

Order for 50 standard packages less 5%
" " 100 " " " 10%
" " 200 " " " 15%
" " 400 " " " 20%

GROUP 12. FIRMASIL BRAND LABORATORY GLASSWARE

Discounts as for group 11.

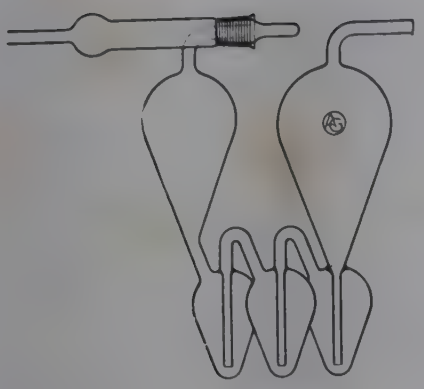
GROUP 13. DAVISIL BRAND LABORATORY GLASSWARE

Order for 3 standard packages less 7½%
" " 20 " " " 10%
" " 50 " " " 12½%
" " 100 " " " 15%

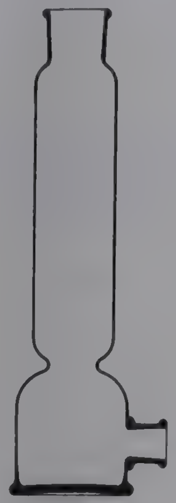
BRITISH STANDARDS SPECIFYING LABORATORY APPARATUS

Copies of Standards are available from The British Standards Institution, Sales Branch, Newton House, 101 Pentonville Road, London, N.1

BS No.	TITLE
188	Viscosity of liquids in absolute units.
410	Test sieves.
501	Metric units of volume and standard temperature of volumetric glassware.
572	Interchangeable conical ground joints.
593	Laboratory thermometers.
604	Graduated measuring cylinders.
611	Petri dishes.
612	Nessler cylinders.
615	Kohlrausch flasks.
619	Incubator, water bath and oven thermometers.
625	Bacteriological test tubes.
658	Apparatus for determination of distillation range.
675	Sugar flasks.
676	Flasks with graduated necks.
691	Clinical thermometers.
692	Meteorological thermometers.
696	Fat in milk products by the Gerber method.
700	Graduated pipettes.
701	Brewers' mash flasks.
718	Hydrometers.
733	Density bottles.
734	Hydrometers for use in milk.
748	Haemacytometer counting chambers.
756	Dean and Stark apparatus.
769	Chemical analysis of butter.
770	Chemical analysis of cheese.
773	Ostwald-Folin pipettes.
791	Bomb calorimeter thermometers.
795	Ampoules.
797	Capillary pipettes.
830	Winchester bottles.
846	Burettes.
894	Ubbelohde apparatus.
914	Quality of laboratory porcelain.
1016	Analysis and testing of coal and coke.
1017	Sampling of coal and coke.
1079	Haldane haemoglobinometers.
1132	Automatic pipettes.
1365	Short-range short-stem thermometers.
1428	Microchemical apparatus.
1583	One mark pipettes.
1704	General purpose thermometers.
1733	Flow cups and methods of use.
1739	Filter flasks.
1741	Chemical analysis of liquid milk.
1742	Chemical analysis of condensed milk.
1743	Chemical analysis of dried milk.
1751	Glass stopcocks.
1752	Fritted disk filters.
1756	Sampling and analysis of flue gases.
1792	One mark volumetric flasks.
1797	Calibration tables for volumetric glassware.
1848	Glass condensers.
1900	Secondary reference thermometers.
1923	Glass filter funnels.
2011	Climatic and durability tests.
2021	Separating funnels.
2058	Weighing pipettes.
2069	Gas sampling tubes.
2070	Lunge nitrometers.
2071	Soxhlet extractors.
2461	Gas washing bottles.
2511	Water by the Karl Fischer method.
2554	Sedimentation tubes for red blood corpuscles.
2586	Glass electrodes.
2646	Copper autoclaves.
2648	Performance tests for electric drying ovens.
2701	Rees Hugill powder density flask.
2734	Boiling flasks.
2735	Iodine flasks.
2761	Spherical ground glass joints.
2774	Drawing conventions for glass apparatus.
2775	Rubber tubing and bungs.
2839	Pensky-Martens flash point apparatus.
2840	Maximum and minimum thermometers.
2841	Wet and dry bulb hygrometer.
2842	Whirling hygrometer.
2843	Spirit-in-glass metal sheathed thermometer.
2877	Drop point of petroleum grease.
2878	Tetraethyl lead in gasoline.
2882	Water and sediment in oils.
2982	Scalpels with detachable blades.
3095	Freezing point of milk.
3145	Potentiometric pH meters.
3156	Sampling and analysis of fuel gases.
3166	Thermographs (liquid or vapour filled).
3202	Laboratory furniture.
3218	Test tubes and boiling tubes.
3231	Thermographs (bimetallic).
3235	Test methods for bitumen.
3292	Hygrometers.
3324	Vapour pressure of liquefied petroleum products.
3325	Reid vapour pressure of petroleum products.
3406	Particle size of powders.
3421	Performance of electric sterilising ovens.
3422	Laboratory deflection pH meters.
3442	Abel flash point apparatus.
3473	Testing chemical resistance of laboratory glassware.
3517	Thermal shock tests on laboratory glassware.
3718	Laboratory humidity ovens (non-injection type).
3763	International system (SI) units.
3787	Glass condensers with standard joints.
3898	Laboratory humidity ovens (injection type).



AB-450



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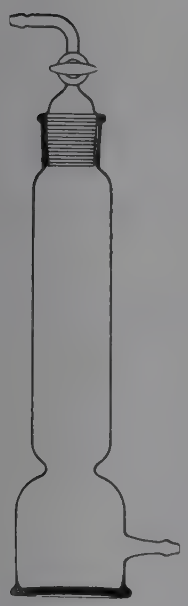
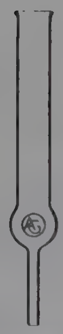


AB-530



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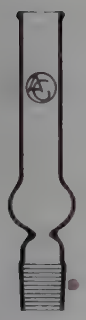

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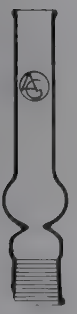

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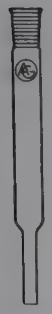

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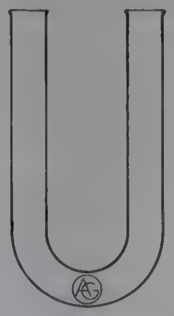


AB-650

GLASS BALLS, solid for packing absorption columns and tubes see GR-100 in List No. sequence.

AB-450

ABSORPTION BULB, (AG), **Geissler & Mohr,** borosilicate glass, with ground-on calcium chloride tube AB-640 ... Dozen **£16. 0. 0.** Each **£1. 9. 0.** *a*

AB-520

ABSORPTION TOWERS, borosilicate glass, with internally ground moulded outlet at bottom.

Size	25×5	30×5	40×6·3 cm	
Dozen	**216/–**	**252/–**	**330/–**	*d*
Each	**20/–**	**23/6**	**30/3**	

AB-530

ABSORPTION TOWERS, borosilicate glass, with tubulure and ground-in stopcock. Joint size 34/35.

Size	25×5	30×5 cm	
Dozen	**546/–**	**607/–**	*d*
Each	**50/7**	**56/2**	

REPLACEMENT PART

BK-342 **Stopcock** only, for above, with standard 34/35 joint cone. For price see entry in List No. sequence.

AB-600

ABSORPTION TUBES, (AG), **straight form,** with one bulb and tube long enough for bending. The specified length excludes the narrow connecting tube.

Length	10	15	20 cm	
Diameter	12	20	25 mm	
Dozen	**17/6**	**23/–**	**26/6**	*a*
Each	**3/1**	**3/6**	**3/9**	

AB-620

ABSORPTION TUBE, (AG), **straight form,** borosilicate glass, with bulb and 14/15 cone joint, for use as desiccant guard tube. Overall length 100 mm, internal diameter 10 mm. Dozen **£3. 6. 0.** Each **£0. 6. 8.** *a*

AB-625

ABSORPTION TUBE, (AG), borosilicate glass, as AB-620 but with 14/15 socket joint.
Dozen **£3. 14. 0.** Each **£0. 7. 4.** *a*

AB-640

ABSORPTION TUBE, (AG), **straight form,** borosilicate glass, 65×12 mm, with standard joint socket 10/13.
Dozen **£5. 18. 0.** Each **£0. 10. 9.** *a*

AB-650

ABSORPTION TUBES, (AG), **U shape,** plain form.

Length	10	12·5	15 cm	
Diameter	12	15	20 mm	
Dozen	**25/–**	**27/–**	**32/–**	*a*
Each	**3/8**	**3/9**	**4/2**	

All items on this page normally available from stock.

AB-655

ABSORPTION TUBES, (AG), U shape, with side arms.

Length	10	12·5	15 cm	
Diameter	12	15	20 mm	
Dozen	32/–	36/–	46/–	*a*
Each	4/2	4/6	5/2	

AB-660

ABSORPTION TUBE, (AG), U shape, Wohler, with 3 bulbs. Length 15 cm, diameter 20 mm.
Dozen **£3. 2. 0.** Each **£0. 6. 4.** *a*

AB-665

ABSORPTION TUBES, (AG), U shape, with side arms and two ground-in stopper stopcocks.

Length	10	12·5	15 cm	
Diameter	12	15	20 mm	
Dozen	140/–	175/–	190/–	*a*
Each	12/9	16/–	17/6	

AB-700

ABSORPTION TUBE, (AG), Arnold, borosilicate glass, overall height 125 mm.
Dozen **£5. 0. 0.** Each **£0. 9. 3.** *a*

AB-710

ABSORPTION TUBE, (AG), Midvale-Stetser Norton, borosilicate glass, height 125 mm, ground-in stopper.
Dozen **£10. 5. 0.** Each **£0. 18. 6.** *a*

AB-730

ABSORPTION TUBE, (AG), Nesbitt, borosilicate glass, height 125 mm, capacity 50 ml.
Dozen **£24. 0. 0.** Each **£2. 4. 0.** *a*

AB-750

ABSORPTION TUBE, (AG), Riley, borosilicate glass, to BS 1016, Part 3, 200 × 20 mm, with concentric inner tube fitted with ground joint.
Dozen **£8. 0. 0.** Each **£0. 14. 6.** *a*

AB-770

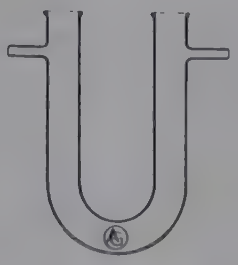
ABSORPTION TUBE, (AG), Blount, as described by Haldane & Graham in 'Methods of Air Analysis', for absorption of moisture and carbon dioxide.
Dozen **£30. 0. 0.** Each **£2. 14. 0.** *a*

AB-800

ABSORPTION TUBE, (AG), borosilicate glass, with fritted distributor plate 30 mm dia., No. 2 porosity with guard tube, cone and socket 12/14. Approximate weight 40 g, height 120 mm, Ref. No. 47X2.
Dozen **£19. 0. 0.** Each **£1. 15. 0.** *a*

REPLACEMENT PART

AB-801 **Guard tube** only, with cone 12/14.
Dozen **£6. 5. 0.** Each **£0. 11. 3.** *a*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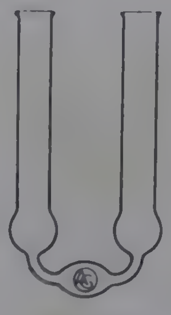
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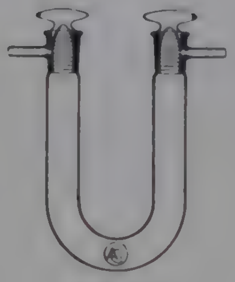
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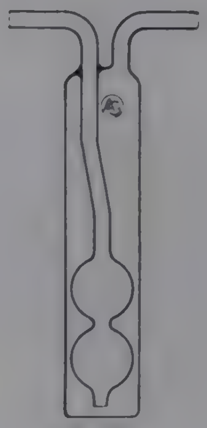
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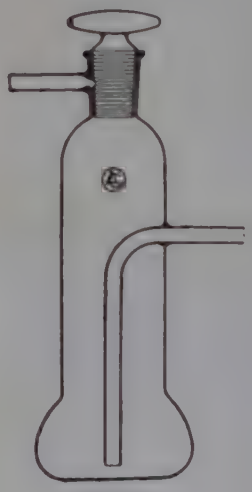
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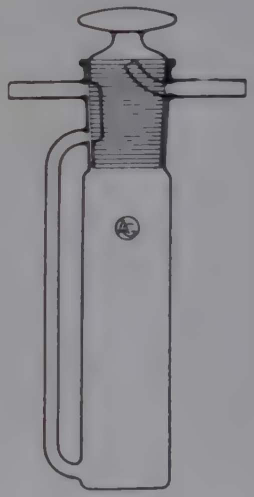
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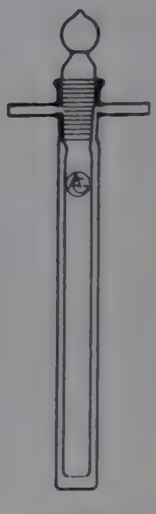
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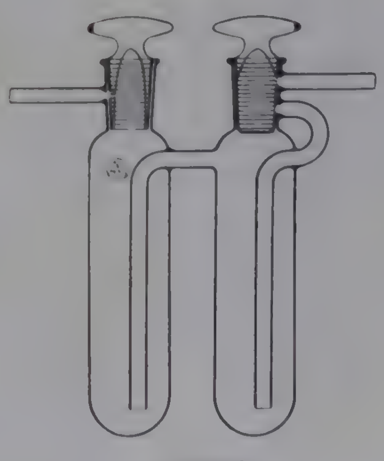
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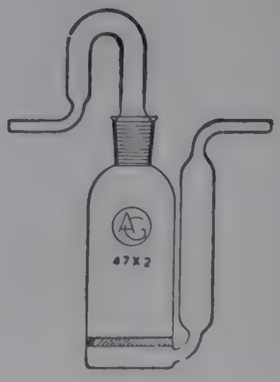
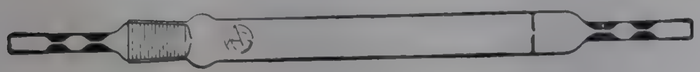


AB-800

All items on this page normally available from stock.

AB-860

ABSORPTION TUBE, Ⓐ, **Pregl, micro,** soda-lime glass, to BS 1428, part A1, Type 1, with perforated diaphragm and hollow ground-in stopper. Filling length 85 mm, overall length 165 mm. Weight 8 g.
Dozen **£22. 0. 0.** Each **£2. 0. 0.** *a*



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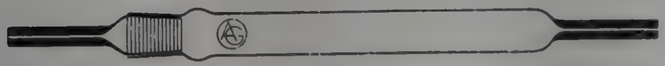
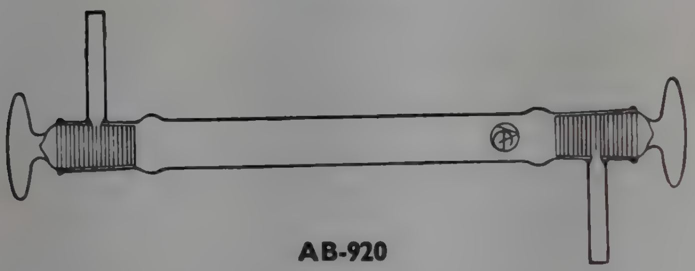
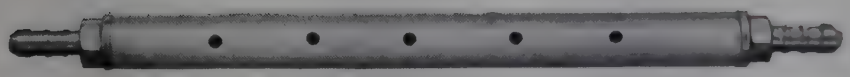


AB-865



AB-920



AB-940

AB-865

ABSORPTION TUBE, Ⓐ, **Pregl, micro,** borosilicate glass, to BS 1428, part A1, Type 2, with hollow ground-in stopper and capillary end tubes. Filling length 85 mm, overall length 165 mm. Weight 8 g.
Dozen **£15. 0. 0.** Each **£1. 7. 0.** *a*

AB-920

ABSORPTION TUBE, Ⓐ, **Flaschenträger type,** with hollow blown stopper-stopcocks at each end. Dia. 10 mm, overall length 125 mm.
Dozen **£22. 0. 0.** Each **£2. 0. 0.** *a*

AB-940

ABSORPTION TUBE, metal sheathed, suitable for connection in a flexible gas line and for drying cylinder gases. The absorption tube, capacity about 12 ml, is of heavy wall glass which will withstand over 20 atmospheres internal pressure. It is contained in a tubular steel sheath which is drilled to enable the charge to be viewed. Hose nozzles screw into each end of the steel tube and seal with 'O' rings in the glass tube. Dismantling and re-packing with solid charge can be done in less than 1 minute. The hose nozzles are suitable for 6·5 or 8 mm bore flexible rubber or plastics hose ... ... Each **£2. 17. 6.** *b*

REPLACEMENT PARTS

AB-942	**Glass tube ... ...**	Each	£0. 3. 3.	b
AB-943	**Toroidal sealing rings ... ...**	Dozen	£0. 4. 9.	b

ADHESIVES

AE-040

ADHESIVE, *Araldite.* An epoxide resin suitable for joining non-porous surfaces, such as glass, metal, ceramics, etc. Heat resistant, unaffected by water, oils and most solvents. Does not shrink on setting. Supplied in a pack containing a tube of resin, a tube of hardener, and working instructions.
Dozen **£3. 5. 0.** Each **£0. 6. 0.** *m*

AE-050

ADHESIVE, *Evo-stik,* a heavy duty impact adhesive which produces a durable water and oil resistant bond between most porous and non-porous materials. Supplied in collapsible tube containing 1½ fl. oz. With instructions for use. Unsuitable for use with polystyrene or cellulose paint ... ... Each **£0. 2. 6.** c

AE-060

ADHESIVE, asbestos cement. Acid resistant, for joining asbestolite flue piping, bench tops, etc. and for fireclay and stoneware troughs and pipes. Supplied in a tin with a separate tin of solvent solution, and full directions for use.

Size	1¾	7 lb	
Each	£0. 14. 3.	£1. 10. 0.	c

AE-082

ADHESIVE, *Bostik* **'C'.** A powerful general purpose black adhesive suitable for fixing Technolite and black Technoplate. Supplied in tin containing ½ pint.
Each **£0. 4. 3.** c

AE-084

ADHESIVE, *Bostik* **clear.** A transparent material which remains pliable when set and is particularly suitable for joining plastics materials. Supplied in small collapsible tubes.
Dozen **£1. 1. 0.** Each **£0. 3. 4.** *m*

AE-100

ADHESIVE, Chatterton. A solid cement applied by heating. Supplied in 2-oz sticks.
Dozen **£1. 0. 0.** Each **£0. 3. 3.** *m*

AE-160

ADHESIVE, Krönig substitute. Suitable for making gas-tight connections in combustion trains, etc. Supplied in ½-oz sticks ... Dozen **£1. 5. 0.** Each **£0. 3. 8.** c

AE-200

ADHESIVE, Perspex. Suitable for all Perspex to Perspex joints. In tin containing 10 fl. oz.
Each **£0. 7. 0.** *m*

All items on this page normally available from stock.

AIR PUMPS

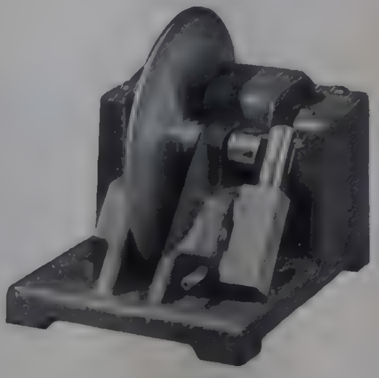
AF-320

AIR PUMP, hand operated, compression and exhaust, with barrel 17·5×3 cm (7×1¼ in) and corrugated nipples for tubing connection. Each **£5. 8. 0.** *c*

AF-320

AF-380

AIR PUMP, piston type, for general aerating purposes. The pump is driven by a sturdy rotating disk 30W induction motor, and is very quiet in operation. Solid bearings and a ringed, self-lubricating piston ensure trouble-free continuous running. The output of the pump is about 0·75 l./min at 0·4 kgf/cm^2. For 200/250V a.c. single phase supplies ... ... Each **£6. 10. 0.** *m*



AF-380

AF-400

AIR PUMP, DIAPHRAGM TYPE, for general aerating purposes. A quiet running pump operated by a solenoid and fitted with a neoprene diaphragm. Output is about 1·5 l./min free air, maximum pressure 0·15 kgf/cm^2. In moulded plastics case mounted on foam rubber. For 200/240V a.c. single phase supplies, consumption 3 watts ... ... Each **£1. 4. 0.** *m*

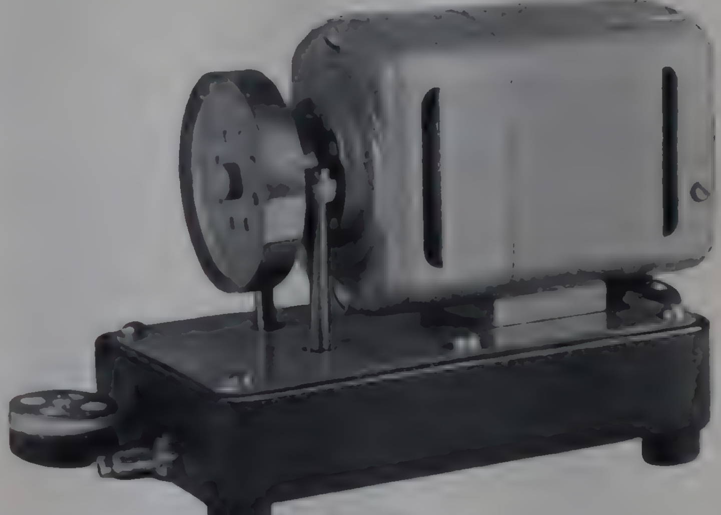
REPLACEMENT PART

AF-401 **Diaphragms, pack of 3** ... ... **£0 2. 6.** *m*

AF-400

AF-410

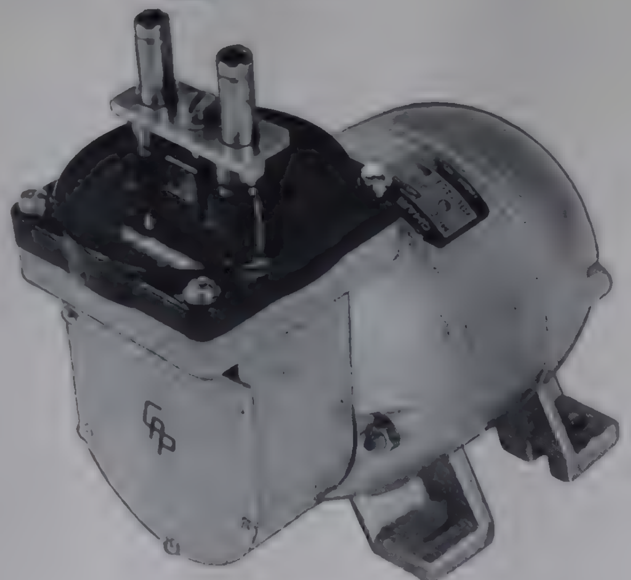
AIR PUMP, diaphragm type. The neoprene diaphragm is operated by connecting rods from a grease packed ball race eccentric on the motor shaft. It is very quiet in operation, compact and reliable. Can be used for pressure or suction to 30 cm Hg. with an output of 4 l./min free air. Fitted with motor, speed control rheostat in base, inlet filter and 5 mm o.d. outlet nozzle. For 200/240V a.c. or d.c. supplies ... ... Each **£10. 0. 0.** *m*



AF-410

AF-414

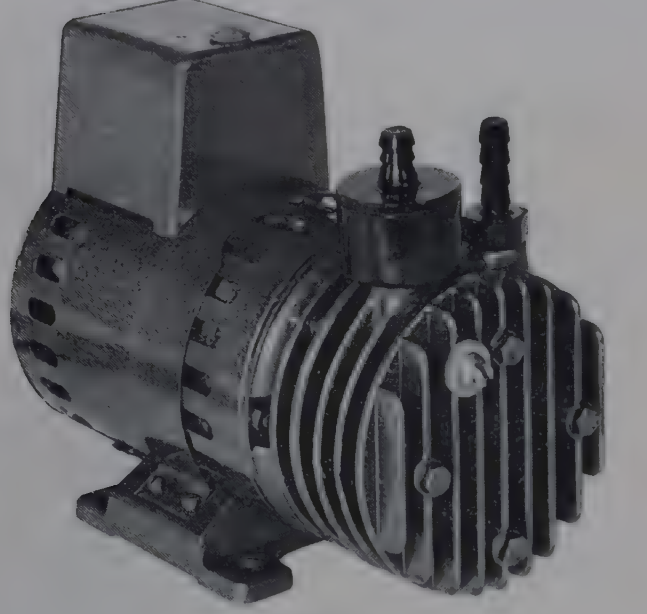
AIR PUMP, diaphragm circulating type. Particularly suitable for closed circuit circulation of air or gases. The diaphragm and disk valves are of neoprene and the pump head of aluminium alloy with chromium plated connecting tubes. Pumping speed is 7 l./min on open circuit. Mounted direct on motor. For 220/240V a.c. supplies. Each **£15. 10. 0.** *m*



AF-414

All items on this page normally available from stock.

COMBINED COMPRESSOR/VACUUM PUMPS



AF-430

AF-430

AIR PUMP, *Edwards* **ECBI.** A non-lubricated rotating carbon vane pump which delivers oil-free air and is suitable for continuous operation. The pump must not be oiled or greased. Directly coupled to the pump is a 1/6 hp motor running at approximately 2850 rev/min. Complete with air filter/silencer, pressure relief valve and inlet and outlet riffled nozzles suitable for 6 mm bore flexible tubing.

Technical Data

Maximum pressure	1 kgf/cm².
Vacuum	100 torr.
Displacement	28 litres/min.
Overall dimensions	11 × 21 × 17 cm high.
Weight, net	4·5 kg.

For 220/240V 50 Hz single phase supplies.

Each **£29. 0. 0.** *f*

ACCESSORIES

AF-434	**Pressure non-return valve** ...	Each	**£1. 4. 6.**	*f*
AF-436	**Air pressure gauge,** with adapter	Each	**£2. 15. 0.**	*f*
AF-438	**Vacuum non-return valve** ...	Each	**£1. 4. 6.**	*f*
AF-440	**Vacuum gauge,** with adapter ...	Each	**£2. 15. 0.**	*f*

AF-445

AF-445

AIR PUMP, *Edwards* **EB3.** An oil lubricated pump mounted on a baseplate with a directly coupled 1/3 hp motor suitable for continuous operation. With pressure relief valve and riffled inlet and outlet nozzles, suitable for 9 mm bore flexible tubing.

Technical Data

Maximum pressure	1·4 kgf/cm².
Vacuum	100 torr.
Displacement	70 litres/min.
Overall dimensions	16 × 44 × 22 cm high.
Weight, net	23 kg.

For 220/240V 50 Hz single phase supplies.

Each **£37. 10. 0.** *f*

ACCESSORIES

AF-447	**Oiler baffle**	Each **£6. 10. 0.**	*f*
AF-434	**Pressure non-return valve** ...	For prices see entries in List No. sequence	
AF-436	**Air pressure gauge,** with adapter		
AF-438	**Vacuum non-return valve** ...		
AF-440	**Vacuum gauge,** with adapter ...		

TROLLEY-MOUNTED VACUUM PUMP AND COMPRESSOR

Mobility of a pumping unit for easy transference between duties—and ready laying aside in a convenient corner when not in use—are advantages appreciated in any laboratory. For details and price see VB-480 in List No. sequence.

HIGH VACUUM PUMPS

see VACUUM APPARATUS

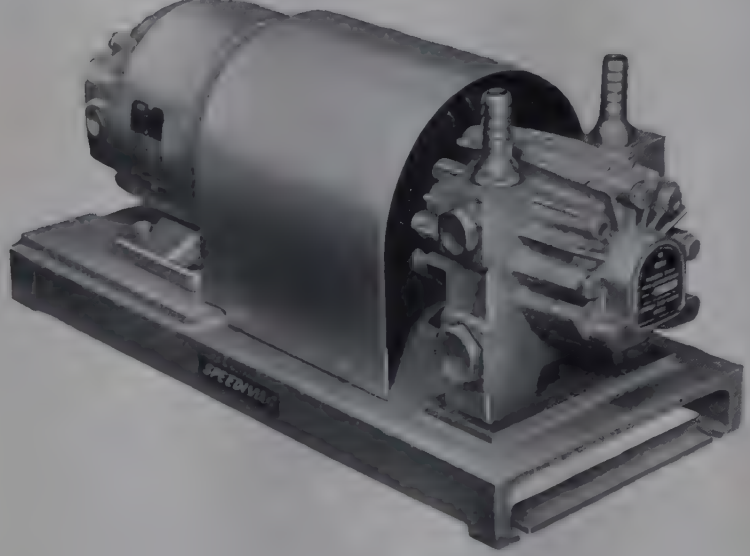
All items on this page normally available from stock.

ROTARY COMPRESSOR AND VACUUM PUMP

MODEL RB5

AF-458

AIR PUMP, *Edwards*, Model RB5, mounted on base with $\frac{1}{2}$ hp motor. Complete with adjustable relief valve and inlet and outlet nozzles suitable for 12 mm bore flexible tubing. The nozzles can be removed so that permanent connections can be screwed into the apertures.



AF-458

Technical Data

Ultimate vacuum	100 torr without baffle 40 torr with oiler baffle
Pressure	1·0 kgf/cm² continuous 1·4 kgf/cm² intermittent
Displacement	140 litres/min

For 220/240V 50 Hz single phase supplies.
Each **£61. 0. 0.** *f*

ACCESSORIES

AF-467	**Oiler baffle**	Each **£6. 12. 9.**	*f*
AF-471	**Air pressure gauge with adapter.**	Each **£4. 15. 0.**	*f*
AF-475	**Vacuum gauge with adapter** ...	Each **£4. 15. 0.**	*f*
AF-477	**Vacuum non-return valve** ...	Each **£2. 5. 0.**	*f*
LX-130	**Pump oil.** For details and prices see entries in List No. sequence.		

OIL FREE AIR COMPRESSOR

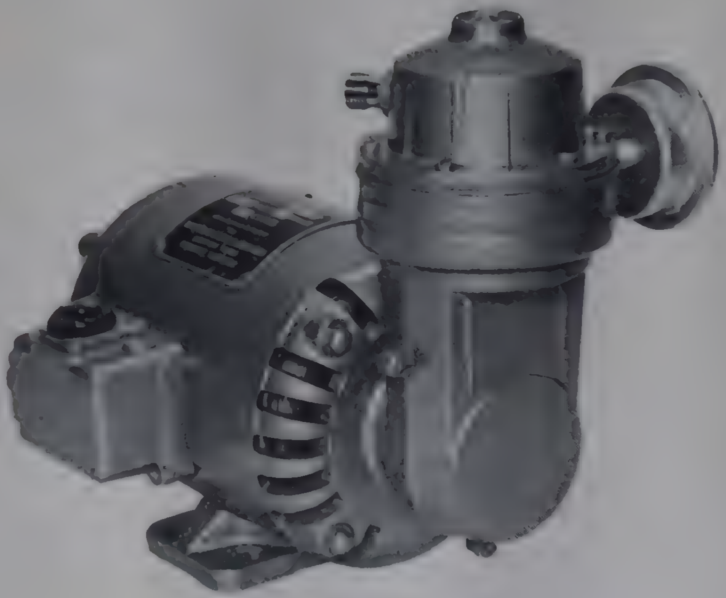
DIAPHRAGM TYPE

AF-510

AIR PUMP, diaphragm. A quiet, low vibration, **oil free** pump designed for continuous running and **especially suitable for use with flame photometers.** The air output, which can be adjusted from 0 to 1·4 kgf/cm² by means of the pressure relief valve, is relatively pulse free as the result of the short pump stroke.

Output pressure kgf/cm²	0	0·35	0·7	1·4
Flow rate to free air l/min	21	20	18	11

The body of the compressor surge chamber and the valve plates are aluminium diecastings. The diaphragm is of nitrile rubber and the flat valves of high carbon steel. A grease packed and sealed ball bearing is used on the big end and no lubrication is required at this point. The inlet is fitted with a large diameter air filter which can be removed to enable the machine to be used for vacuum purposes down to approximately 180 torr. The outlet nozzle accepts 6·5 to 7 mm bore heavy wall flexible tubing. Motor rating $\frac{1}{8}$ hp. Overall dimensions 27·3 × 16·5 21·6 mm high. Net weight 8·2 kg. For 220/240V 50 Hz single phase supplies ... ... Each **£39. 0. 0.** *m*



AF-510

Also available for 400/440V 50 Hz 3-phase supplies and other voltages and frequencies to special order.

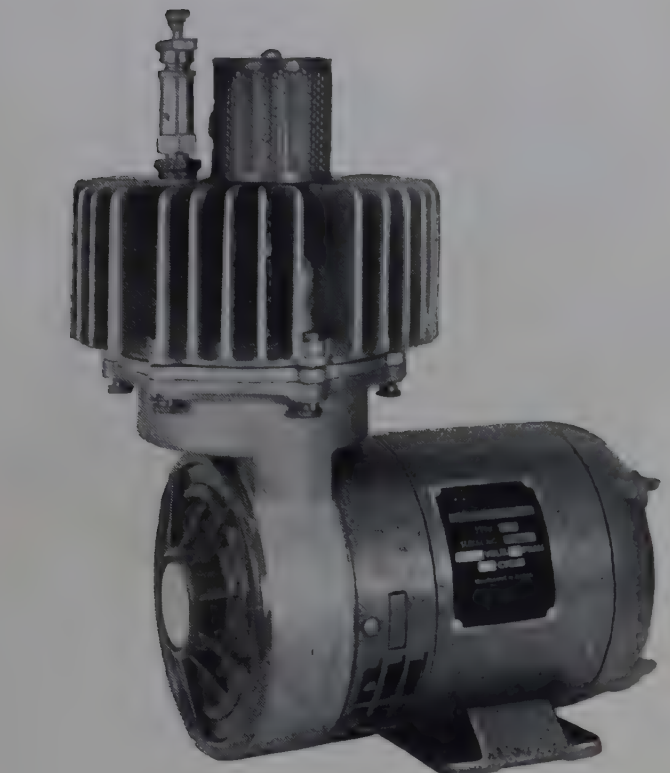
When ordering please state voltage and nature of supply.

All items on this page normally available from stock.

OIL FREE AIR COMPRESSORS

(continued)

DIAPHRAGM TYPE



AF-535

AIR PUMP, diaphragm, for oil free delivery up to 4·2 kgf/cm^2. The pump is fitted with a synthetic rubber diaphragm having an average life of 2000 hours. Motor and pump are fitted with ball bearings requiring only yearly attention.

The unit can also be used for vacuum duty for filtration etc., the valves and fittings being inexpensive to replace in the event of corrosion occurring as the result of contamination. A pressure regulating/safety valve is fitted, with a relief valve for easy starting when pressure remains in the line. The pressure outlet has a male ¼ in B.S.P. thread, which can be replaced by the ½ in hose connector supplied. A suction filter is fitted, which can be removed for vacuum service and replaced by the hose connector.

Technical Data

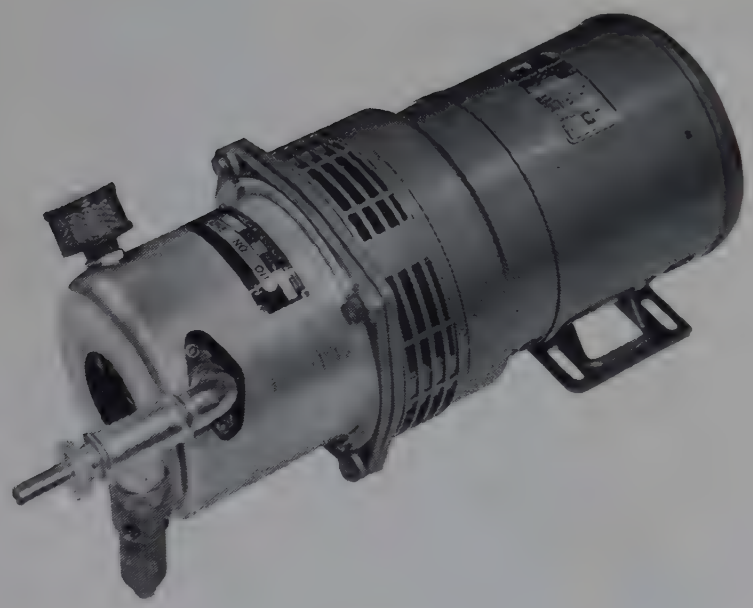
Maximum pressure	4·2 kgf/cm^2 (60 lbf/in^2)
Delivery at 3 kgf/cm^2	30 litres (1 ft^3)/min
Vacuum	150 torr
Overall dimensions	32 × 20 × 40 cm high
Net weight	19 kg

AF-535

AIR PUMP, diaphragm, as specification, with ¼ hp motor for 220/240V 50 Hz single phase supplies.

Each **£55. 0. 0.** *m*

DRY ROTARY TYPE



AF-542

AF-542

AIR PUMP, dry rotary. A non-lubricated air cooled rotating vane pump which delivers oil free air and is suitable for continuous operation. The pump must not be oiled or greased and the sealed bearings require no attention. Integral with the pump is a ventilated ½ hp split phase motor running at approximately 1425 rev/min. A protective thermal cut-out with manual reset is incorporated in the motor body. Complete with air inlet filter, pressure relief valve set at 0·7 kgf/cm^2, outlet nozzle suitable for 12·7 mm bore flexible tubing and instructions for use.

Technical Data

Maximum pressure	0·7 kgf/cm^2 (10 lbf/in^2)
Displacement, maximum	210 l/min
Displacement, at 0·7 kgf/cm^2	140 l/min
Electrical load	3·5A running; up to 10 A initial surge
Electrical supply	220/240V 50 Hz single phase
Overall dimensions	60 × 23 × 20 cm high
Net weight	23 kg

Each **£59. 10. 0.** *m*

AIR PUMPS
FOR PERMANENT INSTALLATIONS

Large output pumps up to 1200 ft^3/hour and high pressure pumps up to 150 lbf/in^2 can be offered for connection to laboratory service lines. Details supplied on request or see AF-550 et seq. in List 650 'Laboratory Furniture and Fittings'.

All items on this page normally available from stock.

ALUMINIUM FOIL

AL-100

ALUMINIUM FOIL, 7·5 cm wide in rolls of 120 metres. Suitable for many purposes in the laboratory, including sealing bottles and culture tubes, stopping leaks, reducing evaporation, covering corks, for thermal insulation or making small weighing boats or dishes. Can easily be labelled with chinagraph pencils, etc.

Roll **£0. 18. 6.** c

ARSENIC DETERMINATION

AP-350

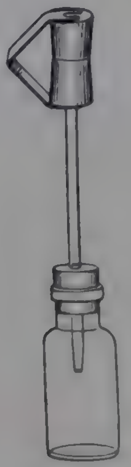
ARSENIC TEST APPARATUS, Gutzeit, to BP specification. Also meets the requirements of BS 642. Comprises test bottle, delivery tube and rubber test paper holder with clip.

Dozen **£7. 15. 0.** Each **£0. 14. 0.** b

COMPONENTS

AP-352	**Delivery tube**	Each **£0. 3. 0.**	a
AP-354	**Rubber test paper holder (2 pieces).**	Pair **£0. 3. 6.**	b
AP-356	**Clip, stainless steel**	Each **£0. 2. 6.**	c
SU-760	**Rubber stopper, size No. 29**	For prices see entries in List No. sequence.	
BT-245	**Test bottle, 125 ml**		

AMMETERS	see ELECTRICAL INSTRUMENTS
APRONS	see CLOTHING, protective
AQUARIA	see BIOLOGICAL SCIENCES



AP-350

ASBESTOS GOODS

AR-430

ASBESTOS CLOTH, commercial white, approximately 100 cm square by 1·5 mm thick. Packed in polythene.

Each **£2. 9. 0.** c

AR-440

ASBESTOS STOPPERS, solid.

Size No.	1	2	3	4	5	
Small end	3/8	1/2	5/8	3/4	7/8 in	
Large end	1/2	5/8	3/4	7/8	1 in	
Length	3/4	3/4	7/8	7/8	1 in	
Std. pack qty.	10	10	10	5	5	
Std. pack	**12/3**	**14/9**	**16/6**	**19/–**	**29/–**	c

AR-460

ASBESTOS FILTER FIBRE, for use in Gooch crucibles. In pack containing 100 g. Each **£0. 10. 6.** c

AR-470

ASBESTOS MILLBOARD, in sheets approximately 100 cm square.

Thickness	4·5	6 mm	
Each	**21/6**	**29/–**	c

AR-472

ASBESTOS MILLBOARD, cut in squares, approximately 3 mm thick. In pack containing 10 squares.

Size of square	15	30 cm	
Dozen packs	**118/–**	**440/–**	c
Pack	**10/9**	**40/–**	

AR-490

ASBESTOS PAPER, commercial white, 1 metre wide, 0·4 mm thick.

Dozen yards **£1. 16. 0.** Yard **£0. 4. 6.** c

AR-500

ASBESTOS PAPER TAPE, commercial white, 0·4 mm thick.

Width	25	50 mm	
180 yard roll	**17/6**	**30/–**	c
10 yards	**2/6**	**3/3**	

AR-505

ASBESTOS WOVEN TAPE, commercial white. Width 25 mm, thickness 1·5 mm. In polythene wrapped reel of approximately 10 metres. Width 25 mm.

Dozen reels **£15. 10. 0.** Reel **£1. 8. 0.** c

AR-540

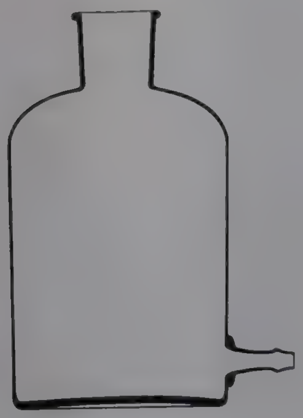
ASBESTOS YARN, commercial white. In 1 lb reel wrapped in polythene.

Diameter	4·5	6 mm	
Dozen reels	**130/–**	**130/–**	c
Reel	**11/9**	**11/9**	

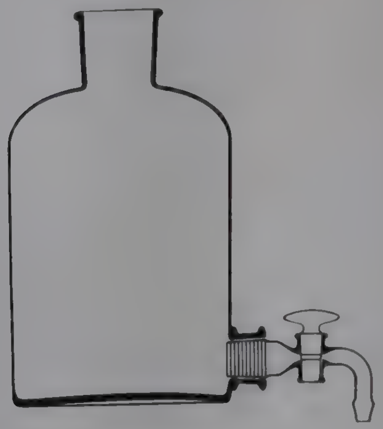
ASBESTOLITE SHEETS	see	FURNITURE
ASBESTOS blanket	see	FIRE EXTINGUISHERS
boards	see	PE-784
gloves	see	CLOTHING, protective
wire gauze	see	GAUZES

All items on this page normally available from stock.

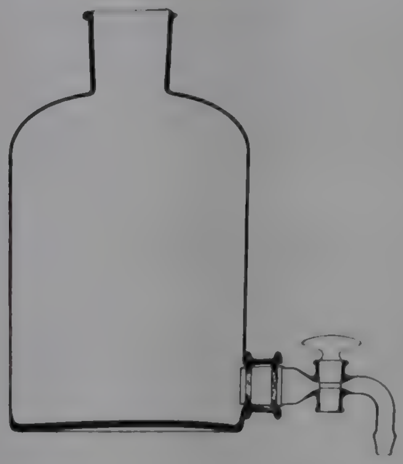
GLASS ASPIRATORS



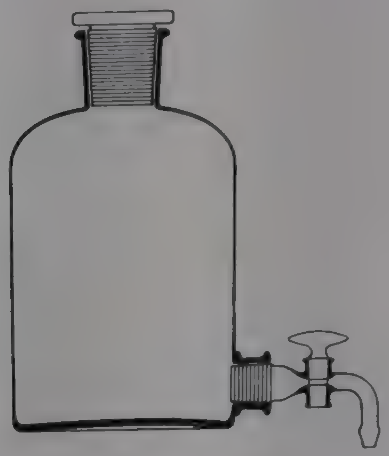
AU-340
AU-360



AU-344
AU-361 with AU-365



AU-361 with AU-367



AU-346
AU-363 with AU-365

AU-340

ASPIRATOR BOTTLES, *Pyrex brand* glass, with tubulure at bottom for rubber tubing connection.

Capacity	250	500	1000	2000 ml	
Std. pack qty.	12	12	12	6	
Std. pack	**115/–**	**171/–**	**198/–**	**124/–**	*d*
Each	**10/8**	**15/10**	**18/4**	**23/1**	

AU-342

ASPIRATOR BOTTLES, *Pyrex brand* glass, with moulded outlet for rubber stopper.

Capacity	2	5	10	20 litres	
Std. pack qty.	2	2	1	1	
Std. pack	**59/–**	**81/–**	**74/5**	**110/5**	*d*
Each	**33/–**	**45/3**	—	—	

AU-344

ASPIRATOR BOTTLES, *Pyrex brand* glass, with moulded outlet fitted with ground-in glass stopcock, standard joint 29/32.

Capacity	2	5	10	20 litres	
Std. pack qty.	2	2	1	1	
Std. pack	**104/–**	**149/–**	**109/9**	**146/9**	*d*
Each	**57/9**	**83/–**	—	—	

AU-346

ASPIRATOR BOTTLES, *Pyrex brand* glass, with moulded outlet fitted with ground-in glass stopcock, standard joint 29/32 and stoppered neck.

Capacity	2	5	10	20 litres	
Std. pack qty.	2	2	1	1	
Std. pack	**126/–**	**178/–**	**133/8**	**189/9**	*d*
Each	**70/4**	**99/2**	—	—	

REPLACEMENT STOPCOCK

AU-365 Stopcock, borosilicate glass 29/32 cone. For price see entry in List No. sequence.

AU-360

ASPIRATOR BOTTLES, *Davisil* borosilicate glass, with tubulure at bottom for rubber tubing connection.

Capacity	250	500	1000	2000 ml	
Dozen	**114/–**	**140/3**	**171/6**	**257/6**	*d*
Each	**10/6**	**12/10**	**15/8**	**23/7**	

AU-361

ASPIRATOR BOTTLES, *Davisil* borosilicate glass, with 29/32 outlet suitable for ground stopcock or rubber stopper. **Without stopcock or rubber stopper.**

Capacity	2	3	5	10	20 litres	
Dozen	**257/6**	**326/9**	**478/6**	**688/6**	**1183/6**	*d*
Each	**25/3**	**30/–**	**43/10**	**62/8**	**107/10**	

AU-363

ASPIRATOR BOTTLES, *Davisil* borosilicate glass, with stoppered neck and 29/32 outlet suitable for ground stopcock or rubber stopper. **Without stopcock or rubber stopper.**

Capacity	2	3	5	10	20 litres	
Dozen	**294/3**	**373/6**	**518/–**	**851/–**	**1605/6**	*d*
Each	**26/4**	**33/6**	**47/3**	**77/6**	**145/5**	

STOPCOCKS for AU-361 and AU-363.

AU-365

STOPCOCK, borosilicate glass, cone 29/32.

Std. pack of 2 **£2. 3. 0.** Each **£1.3.10.** *d*

AU-367

STOPCOCK, *Flexicon*, borosilicate glass, with two PVC rings around the joint to give a degree of flexibility. Suitable for 29/32 socket.

Dozen **£15. 7. 0.** Each **£1. 7. 3.** *m*

AU-445
STOPCOCK, polythene, 8 mm bore
AU-447
STOPCOCK, polythene, 12 mm bore
} For details see entries in List No. sequence.

For suitable rubber stoppers see SU-760 to SU-800, Size No. 27, in List No. sequence.

For stopcocks for use in rubber stoppers see ST-420 in List No. sequence.

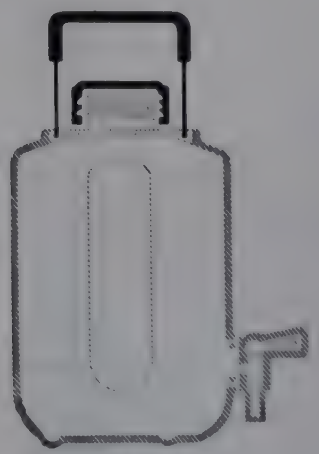
All items on this page normally available from stock.

PLASTICS ASPIRATORS

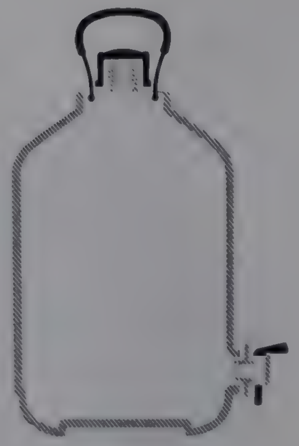
AU-425

ASPIRATOR BOTTLES, rigid polythene, with permanently fitted 8 mm bore stopcock, screw-on cap and plastics covered handle hinged at the neck.

Capacity	4·5	9 litres	
Each	**25/–**	**30/–**	c



AU-425



AU-427

***AU-427**

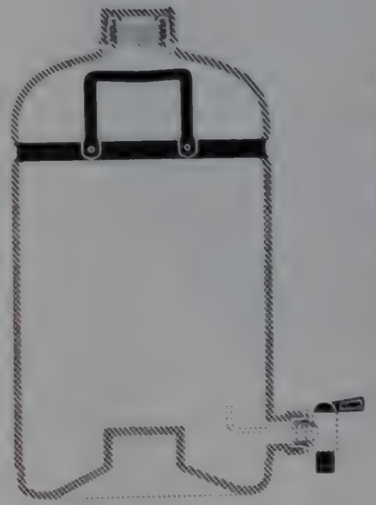
ASPIRATOR BOTTLES, rigid polythene, with interchangeable 8 mm bore stopcock, screw-on cap and plastics covered handle hinged at the neck.

Capacity	2·5	5	10 litres	
Each	**30/–**	**35/–**	**45/–**	c

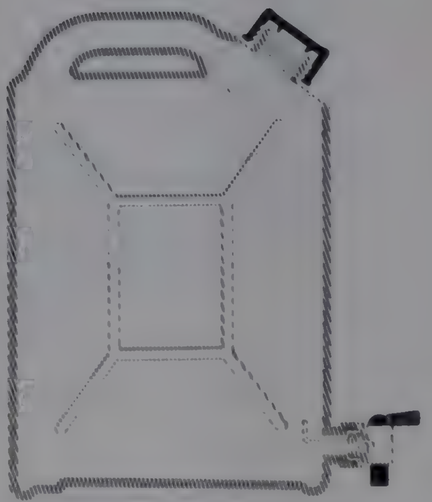
***AU-430**

ASPIRATOR BOTTLES, thick polythene, with interchangeable air-vented 12 mm bore stopcock, 5 cm diameter neck with screw-on cap and plastics covered band around shoulder incorporating lifting handles.

Capacity	15	20	25	30	40	60 litres	
Each	**88/–**	**100/–**	**108/–**	**114/–**	**130/–**	**165/**	m



AU-430



AU-440 (25 litre)

***AU-432**

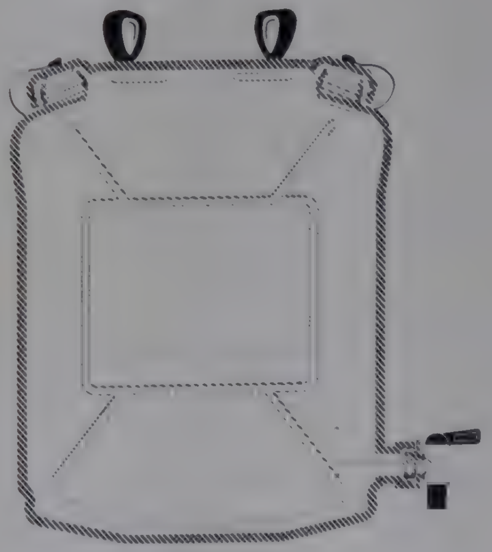
ASPIRATOR BOTTLES, as AU-430, but with 17 cm diameter mouth closed by a press-on cap.

Capacity	15	25	40	60 litres	
Each	**98/–**	**118/–**	**140/–**	**175/–**	m

AU-440

ASPIRATOR BOTTLES, thick polythene, rectangular, with interchangeable air-vented 12 mm bore stopcock on the narrow side, screw-on cap, and carrying handle.

Capacity	25	45 litres	
Width	23	27 cm	
Depth	31	39 cm	
Each	**115/6**	**145/–**	m



AU-440 (45 litre)

REPLACEMENT STOPCOCKS

		Dozen	Each	
AU-445	**Stopcock,** polythene, 8 mm bore suitable for 29/32 socket outlets. Spare for AU-427.	**£1. 10. 0.**	**£0. 4. 0.**	c
AU-447	**Stopcock,** polythene, 12 mm bore with air-vent tube. Suitable for 29/32 socket outlets. Spare for AU-430, AU-432 and AU-440.	**£2. 3. 0.**	**£0. 5. 0.**	c

All items on this page normally available from stock.

Gallenkamp BS AUTOCLAVES

TO BS 2646 'COPPER LABORATORY AUTOCLAVES' FOR ELECTRIC, GAS OR STEAM HEATING

For the steam sterilisation of surgical instruments, dressings and biochemical equipment.

AX-100

- **Design approved by Associated Officers Technical Committee for insurance purposes**
- **Certificate of boiler pressure test issued with each autoclave**
- **Safe, reliable and easy to handle**
- **Automatic air vent and safety valve**
- **Compenstat control of steam temperature within ±1°C**
- **Sturdily engineered for long life**
- **Protective outer case remains cool during operation**

PERFORMANCE AND DIMENSIONS

Maximum working pressure 2·1 kgf/cm² (30 lbf/in²)

Heating times	20–100°C	100–130°C
AX-100	25 min	10 min
AX-110	25 min	12 min
AX-120	Depends on steam supply. Normally about 10 mins to 130°C	
Working depth of boiler	46·0 cm	
Internal diameter of boiler	45·8 cm	
	H W D	
Overall dimensions of autoclave	92 × 66 × 66 cm	
Drain outlet diameter	13 mm	

All boilers are pressure tested during manufacture. Each autoclave is tested under working conditions before despatch and a certificate is supplied giving essential details of construction and tests.

OPERATION AND DESIGN

Electrically heated model.

Temperature is controlled by a *Compenstat* with direct reading scale calibrated 100 to 135°C, and a 6 kW immersion heater which is switched by means of a power relay. Indicator lamps show when the mains and heater are ON.

Gas heated model.

Heating is by a high efficiency burner which consumes coal gas at a maximum rate of 2 m³/hr (70 ft³/hr). A gas governor corrects for fluctuations in gas supply pressure. The gas is ignited by a press button device which is powered from the mains electricity supply; the device also incorporates an automatic flame failure system. Temperature is controlled by means of a *Compenstat*. Combustion products leave through a chimney to which a flue pipe may be connected.

Steam heated model.

Heating is by direct steam injection into the boiler. Maximum steam consumption is about 9 kg (20 lb) per hour. A steam trap is fitted to drain the condensate automatically.

Gallenkamp BS AUTOCLAVES

GENERAL CONSTRUCTION OF ALL MODELS

The boiler is formed from heavy gauge copper with all seams welded, and has a cast gunmetal top rim recessed to accept a rubber gasket. All internal surfaces are heavily tinned.

The cover is a light alloy casting, hinged at the rear and fitted with a lifting handle in front. It is secured by steel captive bolts fitted with plastics hand grips. A spring lifts each bolt away from the boiler when released, so preventing accidental damage when the cover is lowered.

The steam fittings connected to the boiler comprise a 10 cm pressure gauge, stop valve, adjustable safety valve and automatic air vent. A thermometer pocket between the boiler and the air vent enables the autoclave temperature to be measured with a thermometer. The safety valve is an approved type the setting of which can be locked with the padlock supplied. It is fitted with an easing lever. **A water level indicator AX-145 and steam leak AX-148 are available as optional accessories. These are mandatory in BS 2646 but not always required in use.**

The case is made of rigid steel and is mounted on castors for easy movement. The top is stainless steel and all remaining steelwork is rustproofed with exterior surfaces finished in stoved grey enamel.

AX-100

AUTOCLAVE, *Gallenkamp*, **vertical type, electrically heated,** as specification, with automatic air vent, *Compenstat*, pressure gauge, safety valve and steam exhaust system. Certificate of test issued. **Without basket, water level indicator or steam leak.** For a.c. single phase supplies.

For 220/240V	Each **£486**. **0**. **0**.	*bN*
For 200/210V	Each **£486**. **0**. **0**.	*bN*
For 110/120V	Each **£496**. **0**. **0**.	*bN*

REPLACEMENT PART

AX-104	Immersion heater, for AX-100 ..	Each £8. 0. 0.	*b*

When ordering please state voltage and nature of supply.

AX-110

AUTOCLAVE, *Gallenkamp*, **verticle type, coal gas heated,** as specification, with automatic air vent, *Compenstat*, pressure gauge, safety valve and steam exhaust system, for operation with town (coal) gas. **Without basket, water level indicator or steam leak.** Certificate of test issued. ... ... Each **£522**. **0**. **0**. *bN*

Requires a.c. single phase supply (100W max.) for ignition device.

When ordering please state voltage and nature of electricity supply.

NOTE

Autoclaves AX-100 and AX-110 can be fitted with low water cut out and with timing controls to govern period of autoclaving. Please send full details of requirements.

AX-120

AUTOCLAVE, *Gallenkamp*, **vertical type, steam heated,** as specification, with automatic air vent, pressure gauge, safety valve, steam condensate trap and steam exhaust system. **Without basket or steam leak.** Certificate of test issued ... ... Each **£505**. **0**. **0**. *b*

ACCESSORIES for AX-100, AX-110 and AX-120.

AX-130	**Gasket,** rubber, for sealing lid ...	Each **£1**. **7**. **6**.	*b*
AX-135	**Basket,** 45 cm dia. × 45 cm deep, strongly constructed in wire mesh with carrying handle ...	Each **£8**. **0**. **0**.	*b*
AX-137	**Half basket,** 45 cm dia. × 20 cm deep.	Each **£6**. **10**. **0**.	*b*
AX-140	**Wire separator,** for use when layers of small baskets are inserted in autoclaves. Each separator is about 2·6 cm thick and allows the free circulation of steam.	Each **£3**. **12**. **0**.	*b*
AX-142	**Reducing valve,** adjustable, to insert in steam supply line to control the operating pressure. When ordering please state supply pressure ...	Each **£22**. **0**. **0**.	*bN*
AX-145	**Water level indicator,** to conform to BS 2646. Not required on AX-120	Each **£19**. **10**. **0**.	*bN*
AX-148	**Steam leak,** in place of automatic air vent, to conform to BS 2646	Each **£10**. **5**. **0**.	*bN*

Prices for AX-145 and AX-148 apply when ordered with autoclave. Price on application for later fitting.

TJ-060	**Thermometer,** 0–150°C ...	For prices see entries in List No. sequence.
TJ-174	**Thermometer,** B160C/100, 99–160°C	

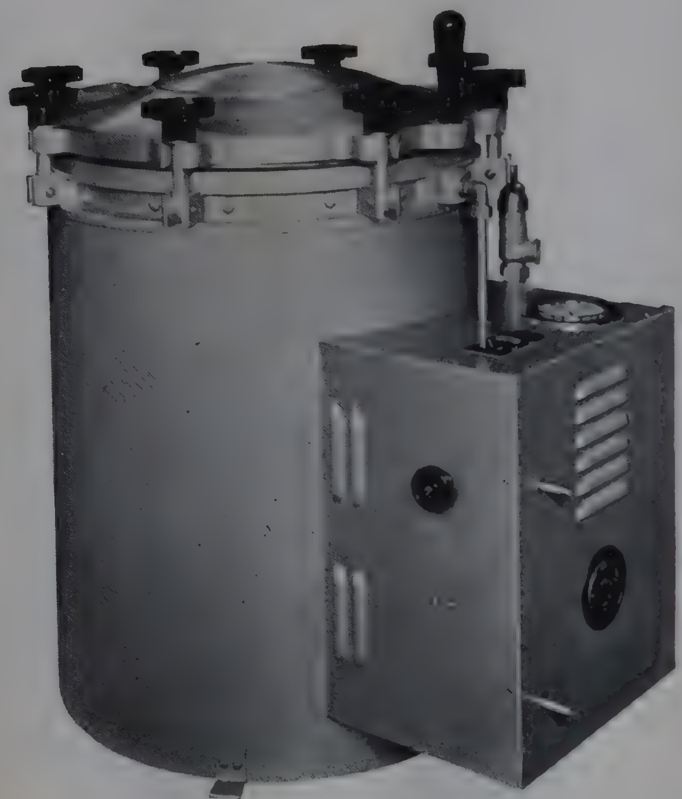
For sterilisation under dry heat conditions see OVENS to BS 3421.

Items on this page normally available from stock except those coded *N*.

Gallenkamp AUTOCLAVES

FOR ELECTRIC OR GAS HEATING

For the steam sterilisation of surgical instruments, dressings and biochemical equipment.



AX-250

- Vertical and horizontal models
- Steam temperature controlled by bimetal thermostat on electrically heated models and gas thermostat on gas heated models
- Integral pressure gauge and safety valve

PERFORMANCE AND DIMENSIONS

Maximum working pressure 2·1 kgf/cm² (30 lbf/in²).

Size	1	2	
Diameter of boiler	24·5	46	cm
Working depth of boiler	30	38	cm
Overall dimensions			
Vertical autoclaves	H W D	H W D	
List No. AX-250	74×56 ×69	80 ×64×81	cm
List No. AX-252	84×54 ×66	94 ×64×81	cm
Horizontal autoclaves			
List No. AX-254	79×64 ×79	91 ×74×84	cm
Drain outlet diameter	10	10	mm

All boilers are pressure tested during manufacture. Each autoclave is tested under working conditions before despatch and a certificate is supplied giving essential details of construction and tests.

OPERATION AND DESIGN

Electrically heated models.

Heating is by a sheathed immersion heater and temperature is controlled by a bimetal thermostat.

Gas heated model.

Temperature is controlled by an adjustable gas thermostat which regulates the supply of gas to the burner.

GENERAL CONSTRUCTION OF BOTH MODELS

The boiler is constructed of copper, with an alloy cover and top ring incorporating a recessed gasket. It is mounted in a steel casing which in the vertical model extends to the floor. The horizontal model is supported on a strong tubular metal stand.

The cover of vertical models is hinged and, after releasing the bolts, may be raised clear of the boiler. Each autoclave is supplied with a wire mesh basket. Horizontal autoclaves have doors hinged on one side and a perforated shelf is supplied with each instead of a wire basket.

Steam fittings comprise a stopcock, adjustable safety valve and pressure gauge, all connected to the body of the boiler. The controls are housed in a control box mounted on the steel casing. The safety valve is an approved type fitted with an easing lever whose setting can be locked with the padlock supplied.

Gallenkamp AUTOCLAVES

AX-250

AUTOCLAVES, vertical type, electrically heated, as specification, with thermostatically controlled immersion heater, pressure gauge, safety valve, and wire mesh basket. For a.c. single phase supplies. Certificate of test issued.

Size No.		1	2
Power rating, max.		3	5 kW
For 220/240V	Each	**£288**. **0**. **0**.	**£400**. **0**. **0**. *b*
For 200/210V	Each	**£288**. **0**. **0**.	**£400**. **0**. **0**. *bN*
For 110/120V	Each	**£293**. **0**. **0**.	**£405**. **0**. **0**. *bN*

When ordering please state voltage and nature of supply.

AX-252

AUTOCLAVES, vertical type, for coal gas heating, as specification, with gas burner and adjustable gas thermostat, pressure gauge, safety valve and wire mesh basket. For connection to ½ in gas main. Certificate of test issued.

Size No.	1	2
Each	**£253**. **0**. **0**.	**£363**. **0**. **0**. *bN*

AX-254

AX-254

AUTOCLAVES, horizontal type, electrically heated, as specification **but** with perforated shelf in place of wire basket. For a.c. single phase supplies. Certificate of test issued.

Size		1	2
Power rating, max.		3	5 kW
For 220/240V	Each	**£340**. **0**. **0**.	**£470**. **0**. **0**. *bN*
For 200/210V	Each	**£340**. **0**. **0**.	**£470**. **0**. **0**. *bN*
For 110/120V	Each	**£346**. **0**. **0**.	**£472**. **0**. **0**. *bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

AX-256 **Immersion heaters,** for AX-250 or AX-254.

Size No.	1	2
Each	**£5**. **6**. **6**.	**£5**. **11**. **0**. *b*

AX-258 **Lid gaskets,** for all models, Size No. 1.
Each **£0**. **9**. **6**. *b*

AX-130 **Lid gaskets,** for all models, Size No. 2. For price see entry in List No. sequence.

When ordering replacement parts please state serial number of autoclave and voltage and nature of supply.

AUTOCLAVES—HIGH PRESSURE

For electric or gas heating, for pressures up to 350 atmospheres, for temperatures up to 350°C, capacities 1 to 5 litres; vertical or horizontal, stationary or rocking patterns in heat and corrosion resisting steel.

Details on application. Please state full requirements including:

- nominal capacity
- horizontal, vertical or rocking
- temperature and pressure
- whether stirring required
- preferred materials, if any
- intended use.

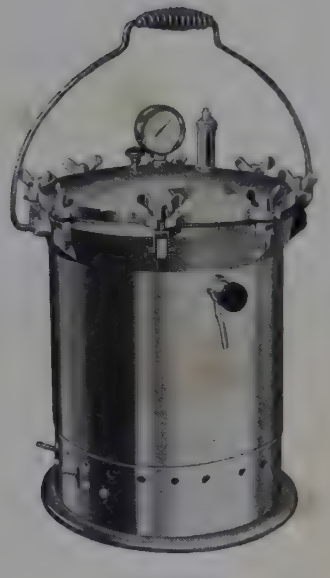
Items on this page normally available from stock except those coded *N*.

AX-360

AUTOMATIC AUTOCLAVE

AX-360

AUTOCLAVE, automatic, steam heated by closed circuit steam produced in an integral electrically heated boiler to eliminate the need for an independent steam supply. Sterilisation is at 134°C and the exposure period is timed automatically for a minimum of 3½ minutes starting from when the correct temperature has been reached. Total cycle time, dependent on load, is about 12 minutes. The stainless steel sterilising chamber, 20 cm dia. × 30 cm deep, has positions for four trays 14 × 28 cm. A lock prevents the stainless steel door from being opened under pressure and a safety cut-out protects the chamber contents from overheating. The sterilising and safe discharging periods are shown by separate indicator lamps mounted on the front panel. A mains ON lamp is also fitted. The autoclave has no permanent air bleeds, no escape of steam from the 'circuit' to atmosphere, and no external piping. Overall dimensions: 49 × 36 × 41 cm. Power rating 2 kW. For 220/240V 50 Hz single phase supplies. Complete with two chromium-plated shelves 14 × 28 cm ... ... Each **£135. 0. 0.** *mN*



AX-382

AX-414

PORTABLE AUTOCLAVES
in aluminium or stainless steel

These autoclaves are tested to twice the normal working pressure before despatch and are approved by insurance companies. The aluminium models are closed by swing bolts and butterfly nuts whereas the stainless steel types have a single knob closure mechanism and both are fitted with pressure gauges, drain cocks, and adjustable safety valves which can be set at 10 lbf/in² (0·7 kgf/cm²) to 15 lbf/in² (1·05 kgf/cm²) on the aluminium models and 15 lbf/in² (1·05 kgf/cm²) to 20 lbf/in² (1·4 kgf/cm²) on the stainless steel models. The reduced pressure which develops after sterilisation may be used to produce dry sterile dressings.

Electrically heated models are fitted with two heaters, maximum power rating 1850W, and a 3-heat switch and are for use on 230/250V supplies.

Gas heated models require but do not include gas burners.

AX-412 and AX-416 accept but do not include two dressing drums AX-435. Other models accept but do not include one dressing drum AX-435.

		BOILER				
List No.	Material	Diameter cm	Depth cm	Heating	Price	
AX-380	Aluminium	28	25	Gas	**£28. 0. 0.**	*m*
AX-382	Aluminium	28	25	Electricity	**£40. 0. 0.**	*m*
AX-410	Stainless steel	28	28	Gas	**£59. 11. 9.**	*mN*
AX-412	Stainless steel	28	51	Gas	**£67. 4. 0.**	*mN*
AX-414	Stainless steel	28	28	Electricity	**£68. 15. 6.**	*mN*
AX-416	Stainless steel	28	51	Electricity	**£75. 17. 3.**	*mN*

REPLACEMENT PARTS

AX-420	**Heating elements**	... Set of 2	**£3. 2. 0.**	*m*
AX-422	**Lid gasket** for AX-380 and AX-382	Each	**£0. 14. 0.**	*m*
AX-424	**Lid gasket** for AX-410 to AX-416	Each	**£0. 14. 0.**	*m*
AX-426	**Safety valve** for AX-380 and AX-382 ...	Each	**£1. 16. 0.**	*mN*
AX-428	**Safety valve** for AX-410 to AX-416 ...	Each	**£1. 16. 0.**	*mN*

ACCESSORIES

AX-435	**Dressing drum,** stainless steel, 24 × 24 cm	Each	**£9. 0. 0.**	*m*
BX-105 **BX-505** **BX-860**	**Ring burners** for use with AX-380, AX-410 and AX-412. For details and prices see entries in List No. sequence.			

Items on this page normally available from stock except those coded *N*.

BALANCES

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New Headquarters, and Research and Development Laboratories, of Mettler at Greifensee-Zurich, Switzerland.

METTLER BALANCES

Gallenkamp are sole distributors for the United Kingdom of Great Britain and Northern Ireland.

The advance of science has always been largely dependent on the development and improvement of measuring techniques. In this context, a major contribution was made when *Mettler* in Switzerland introduced the substitution weighing, single pan analytical balance, employing for the first time the principle of constant beam loading.

In this system the internal weights are suspended on the same end of the beam as the balance pan and are lifted mechanically until the load removed is equal to the weight of the article on the pan so that equilibrium is restored.

Errors due to unequal spacing of knife edges and beam flexing are completely eliminated and the sensitivity of the balance is constant throughout the whole weighing range. *Mettler* are recognised throughout the world as the foremost manufacturers of single pan analytical and precision balances and the following pages present the comprehensive range now available.

METTLER BALANCES INCORPORATE THE FOLLOWING FEATURES:

For accurate weighing

- Weights are manufactured from non-magnetic corrosion resistant nickel-chromium steel.
- Each weight is precision calibrated to an apparent mass density of 8·4.
- Materials used for knife edge suspension systems are chosen for hard wear and long life properties to suit the range of the balance.
- Optical scales, cursors, verniers and digital indicators are designed for quick unambiguous reading.
- Level indicators and adjustable feet are standard.

For rapid weighing

- Wide range optical scales eliminate manipulation of small weights or riders; on many models the addition of weights is eliminated altogether.
- The addition or removal of weights, on those models requiring it, is accomplished simply by knob controls.
- Efficient damping eliminates the time wasted waiting for a swinging beam to settle.
- Partial release of the beam on arrested beam models allows rapid observation of the approach of balance and minimises knife edge wear.
- Several models are equipped with a tare facility to speed operation and eliminate errors of arithmetic subtraction.

THE RANGE OF *METTLER* BALANCES IS DIVIDED INTO TWO BASIC GROUPS:

Analytical balances

A comprehensive range of ultra-micro, micro, general purpose and heavy duty balances of outstanding performance and reliability and with capacities from 2 mg to 8 kg.

- Corundum bearings, jewelled suspension and patented air damping.
- Substitution weighing system with single suspended pan.
- Integral annular concentric weights.
- Easily read optical scale.
- Digital reading on some models.
- Draught-proof weighing chamber.
- Print-out, tare, continuous recording and below the balance weighing facilities available on many models.

Top loading balances

A comprehensive range of compact balances of outstanding performance and rugged durability for rapid, general purpose weighing from 130 g to 13 kg.

- Silicon carbide knife edges, corundum or hardened steel planes and magnetic damping.
- Substitution weighing system with single top-loading pan.
- Integral annular weights.
- Easily read optical scale.
- Automatic level compensation.
- Tare facility.
- Below balance weighing facility.

In addition to these two major groups, *Mettler* also manufacture a number of balances for special purposes such as textile and precious stone measurements. Details of *Mettler* balances are given on pages 33 to 45.

METTLER BALANCES

ULTRA-MICRO ANALYTICAL

***BA-500**

BALANCE, ultra-micro analytical, *Mettler* UM7.
Capacity **2 mg.** Readability **0·0001 mg.**
Precision ±0·0001 mg. Optical scale range 2 mg. Read by means of a built-in microscope and optical micrometer. Complete with two 100 mg tared platinum weighing boats BA-978 ... ... Each **£425. 0. 0.** *mN*

BA-500

***BA-502**

BALANCE, ultra-micro analytical, *Mettler* UM6.
Capacity **10 mg.** Readability **0·0005 mg.**
Precision ±0·0005 mg. Optical scale range 10 mg. Read by means of a built-in microscope directly from digital scale. Complete with two 500 mg tared platinum weighing boats BA-978 ... ... Each **£455. 0. 0.** *mN*

MICRO ANALYTICAL

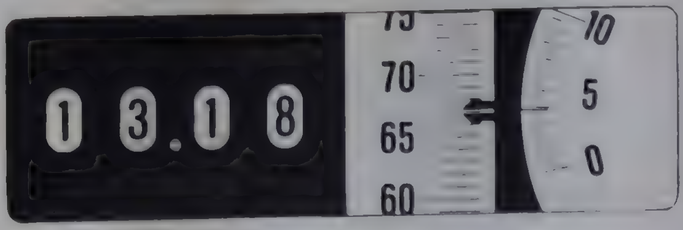
***BA-510**

BALANCE, micro analytical, *Mettler* M5.
Capacity **20 g.** Readability **0·001 mg.**
Precision ±0·001 mg. Optical scale range 20 mg. Stainless steel pan diameter 30 mm, height of stirrup 110 mm. In white finished light alloy housing.
Each **£312. 0. 0.** *m*

BA-510

***BA-512**

BALANCE, micro analytical, *Mettler* M5 GD.
Capacity **20 g.** Readability **0·001 mg.**
As BA-510 but with removable attachment for weighing below the balance ... ... Each **£328. 0. 0.** *m*



Readout display on BA-510 to BA-514

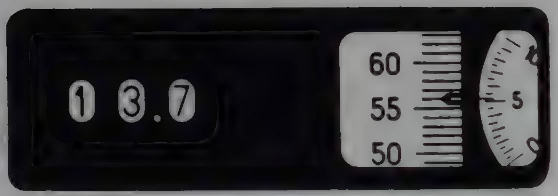
***BA-514**

BALANCE, micro analytical, *Mettler* M5 SA.
Capacity **20 g.** Readability **0·001 mg.**
As BA-510 but with swing out pan for simplified loading.
Each **£348. 0. 0.** *m*

Items on this page normally available from stock except those coded *N*.

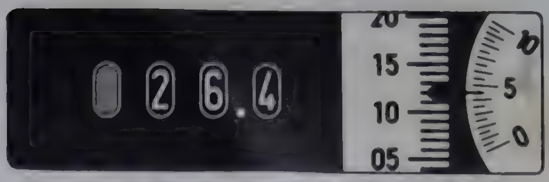
METTLER BALANCES

BA-530



Readout display on BA-530 and BA-532

BA-540



Readout display on BA-540 to BA-544

SEMI-MICRO ANALYTICAL

***BA-530**

BALANCE, semi-micro analytical, *Mettler* H16. Capacity **80 g.** Readability **0·01 mg.** Precision ±0·01 mg. Optical scale range 125 mg. Stainless steel pan diameter 90 mm, height of stirrup 160 mm. In two coloured plastics housing on light alloy base plate ... ... Each **£170. 0. 0.** *m*

***BA-532**

BALANCE, semi-micro analytical, *Mettler* H16 GD. Capacity **80 g.** Readability **0·01 mg.** As BA-530 but with removable attachment for weighing below the balance ... ... Each **£181. 0. 0.** *m*

***BA-540**

BALANCE, semi-micro analytical, *Mettler* B6. Capacity **100 g.** Readability **0·01 mg.** Precision ±0·01 mg. Optical scale range 115 mg. Stainless steel pan diameter 100 mm, height of stirrup 160 mm. In green finished light alloy housing.
Each **£199. 0. 0.** *m*

***BA-542**

BALANCE, semi-micro analytical, *Mettler* B6 GD. Capacity **100 g.** Readability **0·01 mg.** As BA-540 but with removable attachment for weighing below the balance ... ... Each **£209. 0. 0.** *m*

***BA-544**

BALANCE, semi-micro analytical, *Mettler* B6 H26. Capacity **100 g.** Readability **0·01 mg.** As BA-540 but with taller case providing an extra 100 mm height above the pan, giving height of stirrup 260 mm.
Each **£224. 0. 0.** *m*

All items on this page normally available from stock.

METTLER BALANCES

SEMI-MICRO ANALYTICAL

***BA-550**

BALANCE, semi-micro analytical, *Mettler* H20 T.
Capacity **160·1 g.** Readability **0·01 mg.**
Precision ±0·01 mg. Optical scale range 125 mg, total weight displayed digitally. Stainless steel pan diameter 90 mm, height of stirrup 180 mm. With built-in taring system covering the whole weighing range. In two-tone aluminium alloy housing ... ... Each **£191. 0. 0.** *m*

***BA-552**

BALANCE, semi-micro analytical, *Mettler* H20 T GD.
Capacity **160·1 g.** Readability **0·01 mg.**
As BA-550 but with removable attachment for weighing below the balance ... ... Each **£198. 0. 0.** *m*

***BA-560**

BALANCE, semi-micro analytical, *Mettler* H20 P.
Capacity **160·1 g.** Readability **0·01 mg.**
As BA-550 but with print-out facility. After performing a normal weighing operation, the user presses the PRINT button and the weight is recorded on gummed paper tape.
Each **£475. 0. 0.** *mS*

***BA-562**

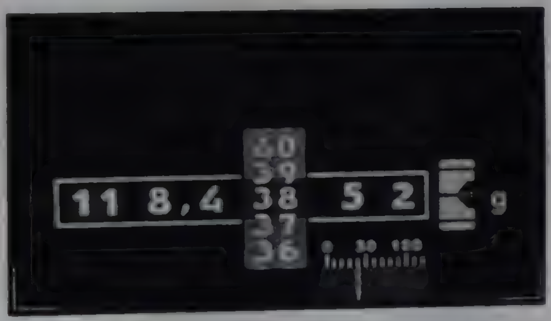
BALANCE, semi-micro analytical, *Mettler* H20 P GD.
Capacity **160·1 g.** Readability **0·01 mg.**
As BA-560 but with removable attachment for weighing below the balance ... ... Each **£482. 0. 0.** *mS*

***BA-564**

BALANCE, semi-micro analytical, *Mettler* H20 E.
Capacity **162 g.** Readability **0·01 mg.**
As BA-550 but with the optical scale replaced by an electrical scale having three ranges and providing six outputs for the operation of recorders, card or tape punching or printing machines (see table below).
Each **£545. 0. 0.** *m*

Range No.		1	2	3
Weight range, g		−0·02 to 0·02	−0·2 to 0·2	−2 to 2
Precision, mg		±0·01	±0·05	±0·5
Electrical Outputs	Load > 10 megohm	1V/mg	0·1V/mg	10V/g
	Load > 50 K ohms	10 mV/mg	1 mV/mg	0·1V/g

BA-550



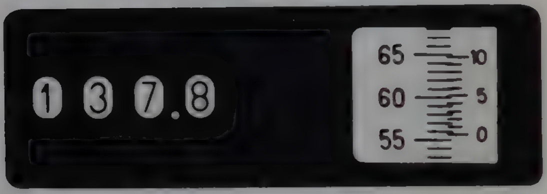
Readout display on BA-550 and BA-552

BA-560

Items on this page coded S normally available from stock.

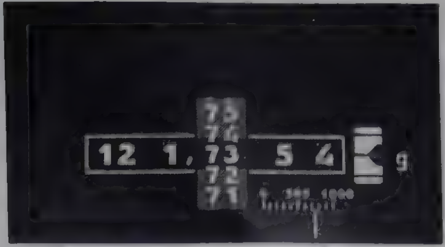
METTLER BALANCES

BA-590



Readout display on BA-590 and BA-592

BA-610



Readout display on BA-614 to BA-622

ANALYTICAL

***BA-590**

BALANCE, **analytical,** *Mettler* H15.
Capacity **160 g.** Readability **0·05 mg.**
Precision ±0·03 mg. Optical scale range 125 mg with vernier readout. Stainless steel pan diameter 90 mm, height of stirrup 160 mm. In two coloured plastics housing on light alloy base plate ... ... Each **£145. 0. 0.** *m*

***BA-592**

BALANCE, **analytical,** *Mettler* H15 GD.
Capacity **160 g.** Readability **0·05 mg.**
As BA-590 but with removable attachment for weighing below the balance ... ... Each **£155. 0. 0.** *m*

***BA-610**

BALANCE, **analytical,** *Mettler* H10 T.
Capacity **161 g.** Readability **0·1 mg.**
Precision ±0·05 mg. Optical scale range 1000 mg, total weight displayed digitally. Stainless steel pan diameter 90 mm, height of stirrup 180 mm. With built-in taring system covering the whole weighing range. In two-tone aluminium alloy housing ... ... Each **£155. 0. 0.** *m*

***BA-612**

BALANCE, **analytical,** *Mettler* H10 T GD.
Capacity **161 g.** Readability **0·1 mg.**
As BA-610 but with removable attachment for weighing below the balance ... ... Each **£162. 0. 0.** *m*

***BA-614**

BALANCE, **analytical,** *Mettler* H10 T W.
Capacity **161 g.** Readability **0·1 mg.**
As BA-610 but with facility for the rapid preweighing of load ... ... Each **£165. 0. 0.** *m*

***BA-616**

BALANCE, **analytical,** *Mettler* H10 T W GD.
Capacity **161 g.** Readability **0·1 mg.**
As BA-610 but with facility for the rapid preweighing of load and removable attachment for weighing below the balance ... ... Each **£172. 0. 0.** *m*

***BA-620**

BALANCE, **analytical,** *Mettler* H10 P.
Capacity **161 g.** Readability **0·1 mg.**
As BA-610 but with print out facility. After performing the normal weighing operation the user presses the PRINT button and the weight is recorded on gummed paper tape.
Each **£434. 0. 0.** *m*

***BA-622**

BALANCE, **analytical,** *Mettler* H10 P GD.
Capacity **161 g.** Readability **0·1 mg.**
As BA-620 but with removable attachment for weighing below the balance ... ... Each **£441. 0. 0.** *m*

All items on this page normally available from stock.

METTLER BALANCES

ANALYTICAL

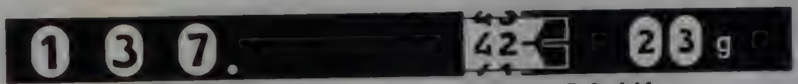
***BA-640**

BALANCE, analytical, *Mettler* H6 dig.
Capacity **160 g.** Readability **0·1 mg.**
Precision ±0·05 mg. Optical scale range 1000 mg, total weight displayed digitally. Stainless steel pan diameter 90 mm, height of stirrup 180 mm. In two coloured plastics housing on light alloy base plate ... Each **£120. 0. 0.** *m*

***BA-642**

BALANCE, analytical, *Mettler* H6 dig GD.
Capacity **160 g.** Readability **0·1 mg.**
As BA-640 but with removable attachment for weighing below the balance ... ... Each **£130. 0. 0.** *m*

BA-642



Readout display on BA-640 to BA-646

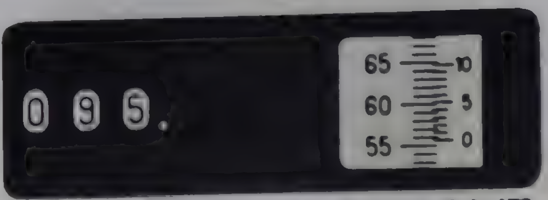
***BA-644**

BALANCE, analytical, *Mettler* H6 T.
Capacity **161 g.** Readability **0·1 mg.**
As BA-640 but with built-in taring system covering the whole of the weighing range ... Each **£145. 0. 0.** *m*

***BA-646**

BALANCE, analytical, *Mettler* H6 T GD.
Capacity **161 g.** Readability **0·1 mg.**
As BA-644 but with removable attachment for weighing below the balance ... ... Each **£155. 0. 0.** *m*

BA-670



Readout display on BA-670 and BA-672

***BA-670**

BALANCE, analytical, *Mettler* H4.
Capacity **160 g.** Readability **0·5 mg.**
Precision ±0·5 mg. Optical scale range 1250 mg with vernier readout. Stainless steel pan diameter 90 mm, height of stirrup 160 mm. In two coloured plastics housing on light alloy base plate ... Each **£98. 10. 0.** *m*

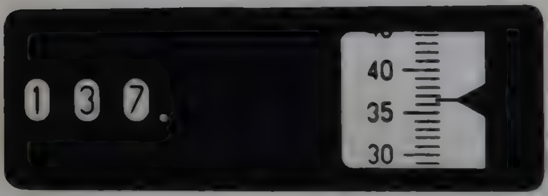
***BA-672**

BALANCE, analytical, *Mettler* H4 GD.
Capacity **160 g.** Readability **0·5 mg.**
As BA-670 but with removable attachment for weighing below the balance ... ... Each **£108. 10. 0.** *m*

All items on this page normally available from stock.

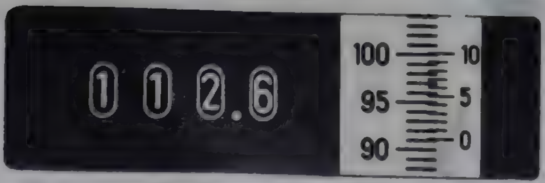
METTLER BALANCES

BA-680



Readout display on BA-680 and BA-682

BA-720



Readout display on BA-720 to BA-726

ANALYTICAL

***BA-680**

BALANCE, analytical, *Mettler* H3.
Capacity **160 g.** Readability **1·0 mg.**
Precision ±1·0 mg. Optical scale range 1250 mg. Stainless steel pan diameter 90 mm, height of stirrup 160 mm. In two coloured plastics housing on light alloy base plate ... ... Each **£94**. **0**. **0**. *m*

***BA-682**

BALANCE, analytical, *Mettler* H3 GD.
Capacity **160 g.** Readability **1·0 mg.**
As BA-680 but with removable attachment for weighing below the balance ... ... Each **£104**. **0**. **0**. *m*

***BA-686**

BALANCE, analytical, *Mettler* H23.
Capacity **160 g.** Readability **1·0 mg.**
Precision ±1·0 mg. Optical scale range 10,000 mg. The unusually long optical scale makes this balance very suitable for rapid control purposes. Stainless steel pan diameter 90 mm, height of stirrup 160 mm. In two coloured plastics housing on light alloy base plate.
Each **£145**. **0**. **0**. *mN*

***BA-720**

BALANCE, analytical, *Mettler* B5.
Capacity **200 g.** Readability **0·05 mg.**
Precision ±0·03 mg. Optical scale range 115 mg with vernier readout. Stainless steel pan diameter 100 mm, height of stirrup 160 mm. In green finished light alloy housing ... ... Each **£175**. **0**. **0**. *m*

***BA-722**

BALANCE, analytical, *Mettler* B5 GD.
Capacity **200 g.** Readability **0·05 mg.**
As BA-720 but with removable attachment for weighing below the balance ... ... Each **£185**. **0**. **0**. *m*

***BA-726**

BALANCE, analytical, *Mettler* B5 H26.
Capacity **200 g.** Readability **0·05 mg.**
As BA-720 but with taller case providing an extra 100 mm, height above the pan giving height of stirrup 260 mm.
Each **£205**. **0**. **0**. *mN*

Items on this page normally available from stock except those coded *N*.

METTLER BALANCES

HIGH CAPACITY ANALYTICAL

***BA-740**

BALANCE, high capacity analytical, *Mettler* B5 C1000.
Capacity **1000 g.** Readability **0·05 mg.**
Precision ±0·1 mg. Optical scale range 115 mg with vernier readout. Stainless steel pan diameter 140 mm, height of stirrup 210 mm. In green finished light alloy housing.
Each **£325. 0. 0.** *m*

***BA-742**

BALANCE, high capacity analytical, *Mettler* B5 C1000 GD.
Capacity **1000 g.** Readability **0·05 mg.**
As BA-740 but with removable attachment for weighing below the balance ... ... Each **£335. 0. 0.** *m*

NOTE: Balances BA-740 and BA-742 can be supplied modified to extend their capacities to 1500 g. Details on request

BA-740

***BA-744**

BALANCE, high capacity analytical, *Mettler* B4 C1000.
Capacity **1000 g.** Readability **0.5 mg.**
Precision ±0·5 mg. Optical scale range 1150 mg with vernier readout. Stainless steel pan diameter 140 mm, height of stirrup 210 mm. In green finished light alloy housing.
Each **£275. 0. 0.** *m*

***BA-746**

BALANCE, high capacity analytical, *Mettler* B4 C1000 GD.
Capacity **1000 g.** Readability **0·5 mg.**
As BA-744 but with removable attachment for weighing below the balance ... ... Each **£285. 0. 0.** *m*

HEAVY DUTY ANALYTICAL

***BA-750**

BALANCE, heavy duty analytical, *Mettler* W5.
Capacity **5000 g.** Readability **1·0 mg.**
Precision ±1·0 mg. Optical scale range 10,000 mg with vernier readout. Stainless steel pan diameter 200 mm, height of stirrup 320 mm. In grey finished light alloy housing.
Price on application. *m*

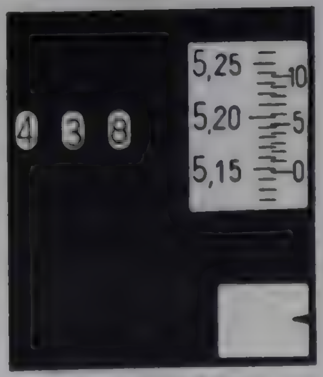
BA-750

***BA-752**

BALANCE, heavy duty analytical, *Mettler* W5/11.
Capacity **5000 g.** Readability **1·0 mg.**
As BA-750 but with **remote control** box connected to the balance by cable ... ... Price on application. *m*

***BA-754**

BALANCE, heavy duty analytical, *Mettler* W8.
Capacity **8000 g.** Readability **1·0 mg.**
Otherwise as BA-750 ... ... Price on application. *m*



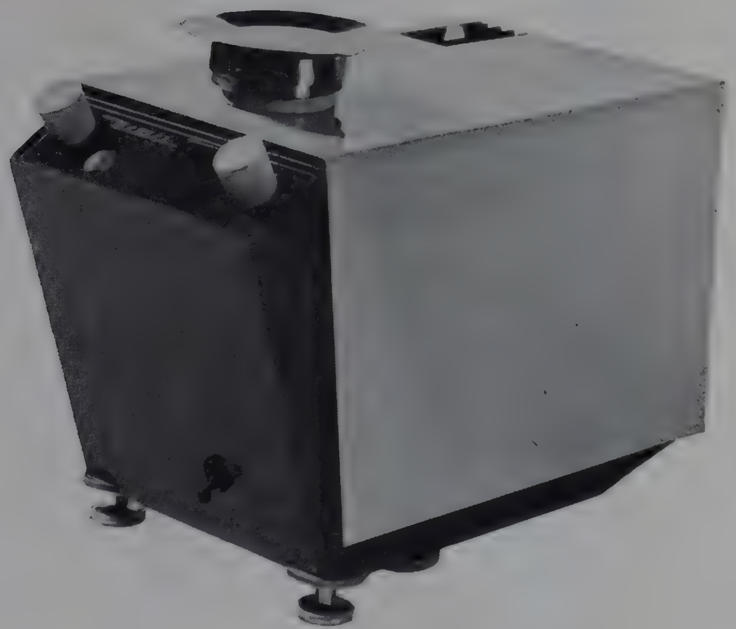
Readout display on BA-750 and BA-752

***BA-756**

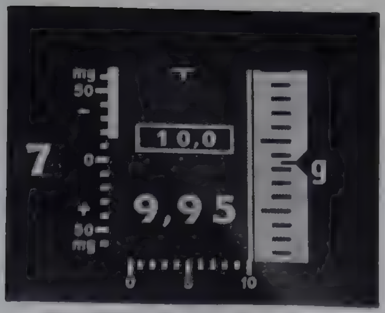
BALANCE, heavy duty analytical, *Mettler* W8/11.
Capacity **8000 g.** Readability **1·0 mg.**
Otherwise as BA-752, with **remote control.**
Price on application. *m*

METTLER BALANCES

BA-790



BA-800



Readout display on BA-800 and BA-802

TOP LOADING

***BA-780**
BALANCE, precision, *Mettler* X11.
Capacity **100 g.** Readability **0·001 g.**
Precision ±0·001 g. Optical scale range 100 g, total weight displayed digitally. In two-tone finished light alloy housing ... ... Each **£98. 10. 0.** *m*

***BA-790**
BALANCE, precision, *Mettler* X12.
Capacity **150 g.** Readability **0·001 g.**
Precision ±0·001 g. Optical scale range 100 g, total weight displayed digitally. With built-in taring system up to **50 g tare.** In two-tone finished light alloy housing. Each **£120. 15. 0.** *m*

***BA-800**
BALANCE, precision, *Mettler* P120.
Capacity **130 g.** Readability **0·001 g.**
Precision ±0·0005 g. Optical scale range 10 g. With built-in taring system up to **10 g tare.** In two-tone finished sheet steel housing ... Each **£145. 0. 0.** *m*

***BA-802**
BALANCE, precision, *Mettler* P120 N.
Capacity **130 g.** Readability **0·001 g.**
As BA-800 but with automatic compensation for errors caused by changes in balance level. Each **£161. 0. 0.** *m*

***BA-810**
BALANCE, precision, *Mettler* P160.
Capacity **170 g.** Readability **0·001 g.**
Precision ±0·001 g. Optical scale range 10 g, total weight displayed digitally. Incorporates complementary scale by which decreases in weight (e.g. as the result of drying) may be read digitally. With built-in taring system up to **10 g tare.** In two-tone finished sheet steel housing. Each **£160. 0. 0.** *m*

***BA-812**
BALANCE, precision, *Mettler* P160 N.
Capacity **170 g.** Readability **0·001 g.**
As BA-810 but with automatic compensation for errors caused by changes in balance level. Each **£175. 0. 0.** *m*

All items on this page normally available from stock.

METTLER BALANCES

TOP LOADING

***BA-820**

BALANCE, precision, *Mettler* P1200.
Capacity **1300 g.** Readability **0·01 g.**
Precision ±0·005 g. Optical scale range 100 g with total weight displayed digitally. With built-in taring system up to **100 g tare.** In two-tone finished sheet steel housing ... ... Each **£160. 0. 0.** *m*

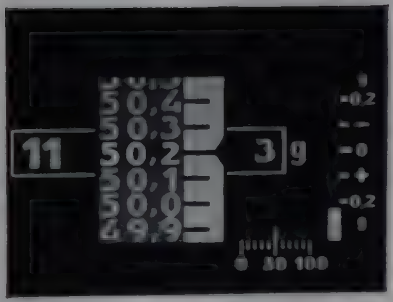
BA-820

***BA-822**

BALANCE, precision, *Mettler* P1200 N.
Capacity **1300 g.** Readability **0·01 g.**
As BA-820 but with automatic compensation for errors caused by changes in balance level. Each **£176. 0. 0.** *m*

***BA-830**

BALANCE, precision, *Mettler* P1000.
Capacity **1300 g.** Readability **0·1 g.**
Precision ±0·05. Optical scale range 1000 g with total weight displayed digitally. With built-in taring system up to **300 g tare.** In two-tone finished sheet steel housing ... ... Each **£140. 0. 0.** *m*



Readout display on BA-820 and BA-822

***BA-832**

BALANCE, precision, *Mettler* P1000 N.
Capacity **1300 g.** Readability **0·1 g.**
As BA-830 but with automatic compensation for errors caused by changes in balance level. Each **£156. 0. 0.** *m*

***BA-840**

BALANCE, precision, *Mettler* P2000.
Capacity **2500 g.** Readability **0·1 g.**
Precision ±0·05 g. Optical scale range 1000 g with total weight displayed digitally. With built-in taring system up to **500 g tare.** In two-tone finished sheet steel housing ... ... Each **£158. 0. 0.** *m*

BA-840

***BA-842**

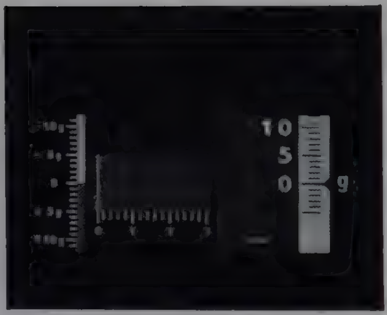
BALANCE, precision, *Mettler* P2000 N.
Capacity **2500 g.** Readability **0·1 g.**
As BA-840 but with automatic compensation for errors caused by changes in balance level. Each **£174. 0. 0.** *m*

All items on this page normally available from stock.

METTLER BALANCES

TOP LOADING

BA-850



Readout display on BA-850

BA-860
BA-880

***BA-850**

BALANCE, precision, *Mettler* P3.
Capacity **5000 g.** Readability **0·2 g.**
Precision ±0·05 g. Optical scale range 3000 g. With built-in taring system up to **2000 g tare** and automatic compensation for errors caused by changes in balance level. In two-tone finished sheet steel housing.
Each **£192. 0. 0.** *m*

***BA-860**

BALANCE, precision, *Mettler* P5.
Capacity **6000 g.** Readability **0·1 g.**
Precision ±0·05 g. Optical scale range 500 g with total weight displayed digitally. With built-in taring system up to **1000 g tare** and automatic compensation for errors caused by changes in balance level. In two-tone finished sheet steel housing ... ... Each **£243. 0. 0.** *m*

***BA-870**

BALANCE, precision, *Mettler* P6.
Capacity **7500 g.** Readability **0·5 g.**
Precision ±0·25 g. Optical scale range 6000 g with total weight displayed digitally. With built-in taring system up to **1500 g tare** and automatic compensation for errors caused by changes in balance level. In two-tone finished sheet steel housing ... ... Each **£218. 0. 0.** *m*

For illustration see opposite page.

***BA-880**

BALANCE, precision, *Mettler* P11.
Capacity **11,000 g.** Readability **0·1 g.**
Precision ±0·05 g. Optical scale range 500 g with total weight displayed digitally. With built-in taring system up to **1000 g tare** and automatic compensation for errors caused by changes in balance level. In two-tone finished sheet steel housing ... ... Each **£276. 0. 0.** *mN*

Items on this page normally available from stock except those coded *N*.

METTLER BALANCES

TOP LOADING

***BA-890**

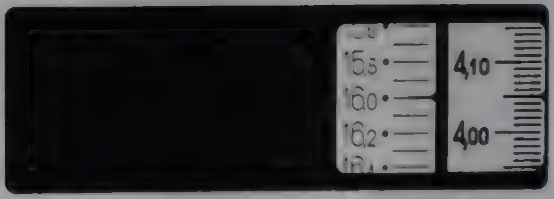
BALANCE, **precision,** *Mettler* P10.
Capacity **13,000 g.** Readability **1·0 g.**
Precision ±0·5 g. Optical scale range 10,000 g with total weight displayed digitally. With built-in taring system for up to **3000 g tare** and automatic compensation for errors caused by changes in balance level. In two-tone finished sheet steel housing ... Each **£215. 0. 0.** *mS*

BA-870
BA-890

SPECIAL PURPOSE

***BA-912**

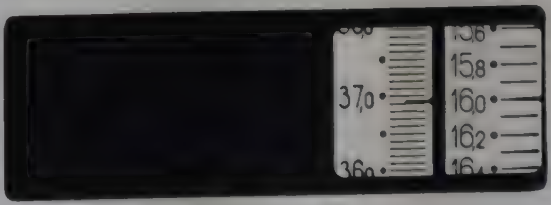
BALANCE, **yarn testing,** *Mettler* H23C 10/13.
Capacity **6·5 to 200 British yarn counts.** Readability **1%.** With additional scales reading grams, deniers and tex-units. Stainless steel pan diameter 90 mm, height of stirrup 160 mm. In two coloured plastics housing on light alloy base-plate ... ... Each **£160. 0. 0.** *m*



Readout scale for BA-912 showing grams, deniers and tex-units to metric system

***BA-916**

BALANCE, **carat,** *Mettler* H3C 160C.
Capacity **160 carats.** Readability **0·001 carats.**
Optical scale range −0·05 to +1·25 carats. Chrome-nickel steel pan diameter 90 mm, height of stirrup 160 mm. Includes diamond pan with handle. In two coloured plastics housing on light alloy base plate.
Price on application. *m*



Readout scale for BA-912 showing British Yarn counts and tex-units to 120 yards

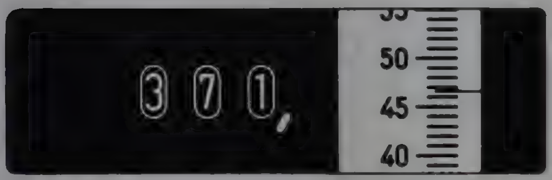
***BA-918**

BALANCE, **carat,** *Mettler* H23C 160C.
Capacity **160 carats.** Readability **0·001carats.**
Optical scale range 10 carats. Chrome-nickel steel pan diameter 90 mm, height of stirrup 160 mm. Includes diamond pan with handle. In two coloured plastics housing on light alloy base plate ... Price on application. *m*

Items on this page coded S normally available from stock.

METTLER BALANCES

BA-922



Readout display on BA-922

SPECIAL PURPOSE

***BA-920**
BALANCE, carat, *Mettler* P1200 C. Capacity **1300 carats.** Readability **0·01 carats.** Optical scale range 100 carats. Taring range 100 carats. With standard balance pan and additional top loading diamond scoop pan. In light grey hammertone finish sheet steel housing ... ... Price on application. *mN*

***BA-922**
BALANCE, carat, *Mettler* B5 D4. Capacity **1000 carats.** Readability **0·001 carats.** Optical scale range −0·05 to +1·1 carats. Chrome-nickel steel pan diameter 100 mm, height of stirrup 160 mm. Includes diamond pan with handle. In green finish light alloy housing ... ... Price on application. *mN*

***BA-924**
BALANCE, carat, *Mettler* B5C 5000 C. Capacity **5000 carats.** Readability **0·001 carats.** Optical scale range 1 carat. Chrome-nickel steel pan diameter 100 mm, height of stirrup 160 mm. Includes diamond pan with handle. In green finish light alloy housing ... ... Price on application. *mN*

REPLACEMENT PARTS FOR METTLER BALANCES

LAMP BULBS, replacement for *Mettler* balances. BA-936 is a replacement bulb for *Mettler* P type balances supplied after December 1967.

List No.	For balances type	Voltage	Each	
***BA-930**	B, M,	6·5	**£0. 13. 9.**	*m*
***BA-932**	H	3	**£0. 11. 3.**	*m*
***BA-934**	P	6·5	**£0. 13. 6.**	*m*
***BA-936**	P	6·0	**£0. 19. 0.**	*m*

***BA-940**
PLASTICS COVER, as supplied with type B and type M balances ... ... Each **£0. 17. 0.** *m*

***BA-942**
PLASTICS COVER, as supplied with type H balances. Each **£0. 13. 0.** *m*

***BA-944**
PLASTICS COVER, as supplied with type UM balances. Each **£1. 1. 0.** *m*

Gallenkamp
REGD TRADE MARK

INSTALLATION AND MAINTENANCE SCHEME FOR USERS IN THE UNITED KINGDOM

To ensure the continued high performance of your *Mettler* balance, we recommend that you have your balance registered under this scheme so that it may receive regular attention by skilled technicians. Only *Gallenkamp* offer this unique service by *Mettler* trained engineers.

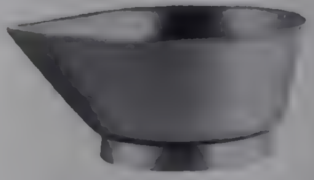
Items on this page normally available from stock except those coded *N*.

METTLER BALANCE ACCESSORIES

BALANCE PANS

Stainless steel balance pans for use with the *Mettler* P series precision balances. Pans for each particular balance have identical weights and can be freely interchanged with each other and with the pan supplied with the balance.

List No.	For balance List No.	Material	Capacity ml	Diameter mm	Height mm	Each	
***BA-950]**	BA-800 BA-810	Stainless steel	180	92	40	£2. 4. 0.	*m*
***BA-952**	BA-820 BA-830	Polypropylene	1750	160	140	£2. 7. 6.	*m*


BA-950

BA-952

LIGHT SHIELDS

***BA-970**

MAGNIFIER/LIGHT SHIELD, for use with model B5 balances. Consists of a light shield and a lens to magnify the optical scale, with bracket to fit into slot in balance case ... ... Each **£1. 12. 0.** *m*

Note: The above item is included as standard equipment on B6 and M5 balances.

***BA-972**

MAGNIFIER/LIGHT SHIELD, as BA-970 but for use with H type balances ... ... Each **£1. 3. 6.** *m*

Note: The above item is included as standard equipment on H15 and H16 balances.

WEIGHING ACCESSORIES

***BA-974**

WATCH GLASSES, tared to a predetermined weight with a tolerance of ±1 mg. When in use, taring disks are removed from the beam, and a minor adjustment made to the zero setting.

Weight	10	20 g	
Diameter	50	70 mm	
Each	**18/–**	**20/–**	*m*

***BA-976**

WEIGHING SCOOPS, nickel, tared, as BA-974.

Weight	10	20 g	
Length	75	105 mm	
Width	25	35 mm	
Each	**44/–**	**48/–**	*m*

***SJ-400**

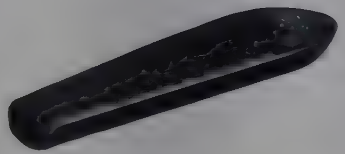
VIBRO-SPATULA, *Mettler.* For price and details see entry in List No. sequence.

***BA-978**

WEIGHING BOATS, platinum, for use with ultra-micro balances.

For balance	UM7	UM6	
Weight	100	500 mg	
Each	**60/–**	**290/–**	*m*

BA-970


BA-976

WORKING COVERS

***BA-980**

PLASTICS WORKING COVER, for use with P120, P160, P1000, P1200 and P2000 top-loading precision balances. This cover is fitted with a transparent window and a hole through which the pan projects. It is intended to protect the balance when in use in dusty locations.

Each **£0. 14. 6.** *m*

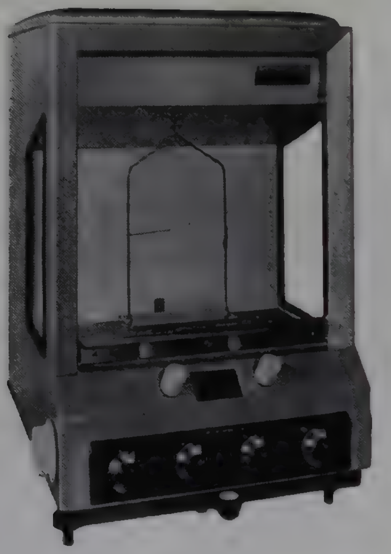
***BA-982**

PLASTICS WORKING COVER, as BA-980 but for use with P3, P5, P6, P10 and P11 top-loading precision balances ... ... Each **£1. 1. 0.** *m*

All items on this page normally available from stock.

ANALYTICAL BALANCES

BB-600



BB-620
BB-625

BB-640
BB-645

BB-600

BALANCE, analytical two pan, *Stanton* A49. Capacity **200 g.** Sensitivity **0·2 mg.** Optical scale range 100 mg. Weighs to 10 g without external weights. Stainless steel pan diameter 10 cm, height of stirrup 17 cm. Includes set of 5 weights (10, 20, 30, 50, 100 g) in turntable adjacent to right-hand pan. 6V, 18W illumination supply from tapped transformer suitable for 110/250V a.c. supplies. In enamelled plywood case with sliding side doors. ... Each **£130. 0. 0.** *f*

BB-620

BALANCE, analytical single pan, *Oertling* R10. Capacity **200 g.** Sensitivity **1·0 mg.** Optical scale range 1150 mg. Preweighing range 2 to 200 g. Taring range 100 g. Rectangular stainless steel pan 12 cm × 6 cm, height of stirrup 16 cm. 6V, 18W illumination supply from transformer suitable for 110/250V a.c. supplies. In aluminium alloy case with slide-up front. Each **£153. 0. 0.** *f*

BB-625

BALANCE, analytical single pan, *Oertling* R20. Capacity **200 g.** Sensitivity **0·1 mg.** Optical scale range 115 mg. Preweighing range 1 to 200 g. Taring range 100 g. Rectangular stainless steel pan 12 cm × 6 cm, height of stirrup 16 cm. 6V, 18W illumination supply from transformer suitable for 110/250V a.c. supplies. In aluminium alloy case with slide-up front. Each **£169. 0. 0.** *fS*

BB-640

BALANCE, analytical single pan, *Stanton* CL4D. Capacity **200 g.** Sensitivity **0·1 mg.** Optical scale range 1000 mg. Digital reading to 200 g without external weights. Rectangular stainless steel pan 10 cm × 7·5 cm, height of stirrup 18 cm. 6V, 18W illumination supply from tapped transformer suitable for 100/250V a.c. supplies. In aluminium alloy case with slide-up front ... ... Each **£165. 0. 0.** *f*

BB-645

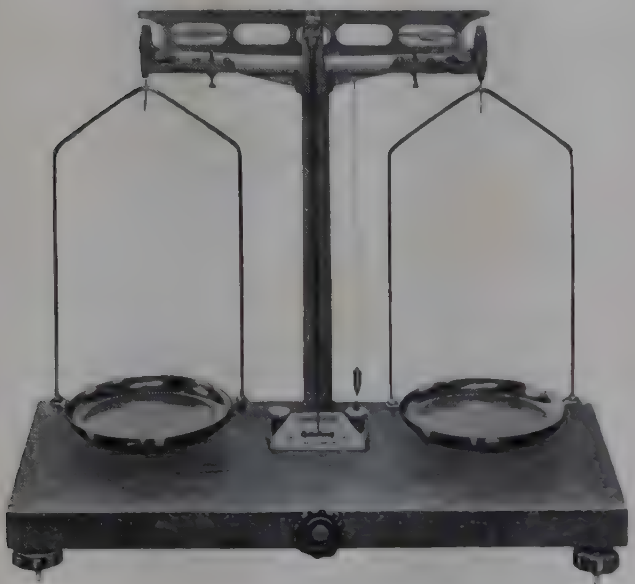
BALANCE, analytical single pan, *Stanton* CL5D. Capacity **100 g.** Sensitivity **0·01 mg.** Optical scale range 100 mg. Digital reading to 100 g without external weights. Rectangular stainless steel pan 10 cm × 7·5 cm, height of stirrup 18 cm. 6V, 18W illumination supply from tapped transformer suitable for 100/250V a.c. supplies. In aluminium alloy case with slide-up front... ... ... Each **£200. 0. 0.** *f*

For suitable **Balance Weights, Forceps,** etc. see pages 54 to 56.

Items on this page coded *S* normally available from stock.

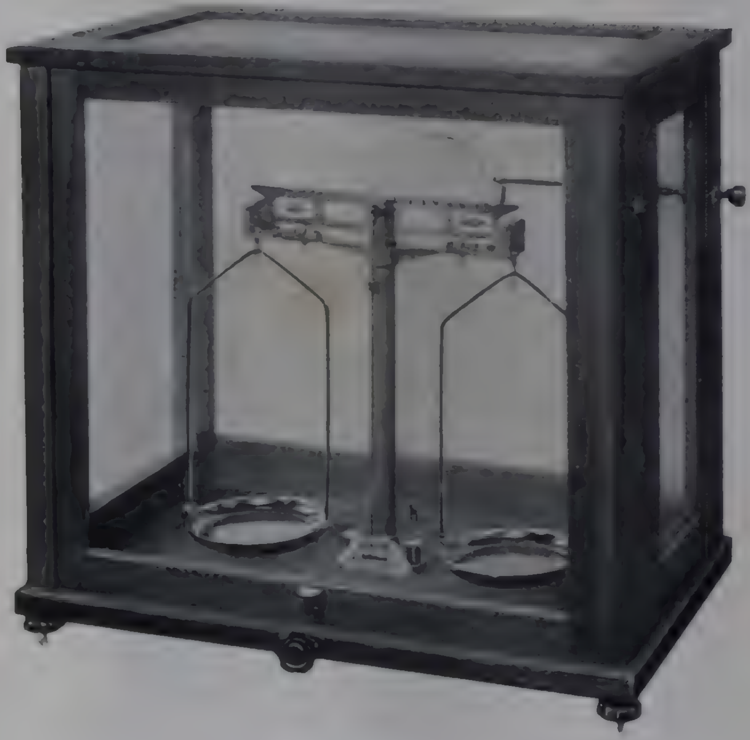
Gallenkamp STUDENT BALANCES

REGD TRADE MARK



BC-030

BC-035 beam



BC-040

- **Agate bearings throughout**
- **Large stainless steel pans**
- **Brass beams**
- **Baseboards and cases solid hardwood**

BC-030

BALANCE, student, *Gallenkamp*.
Capacity **250 g.** Sensitivity **1 mg.**
With long pointer and engraved ivorine scale, screwed feet and plumb line for levelling, brass beam with agate bearings, adjustments for balance, sensitivity and arrested beam position, front mounted beam arrestment knob and stainless steel pans diameter 100 mm, height of stirrup 200 mm ... ... Each **£10. 0. 0.** *b*

BC-035

BALANCE, student, *Gallenkamp*, **twin rider.**
Capacity **250 g.** Sensitivity **1 mg.**
As BC-030 but with additional twin scaled beam mounted above the balance beam and carrying two captive riders. These riders may be adjusted with forceps and obviate the addition of weights of 1 g or less ... Each **£13. 10. 0.** *b*

ACCESSORY

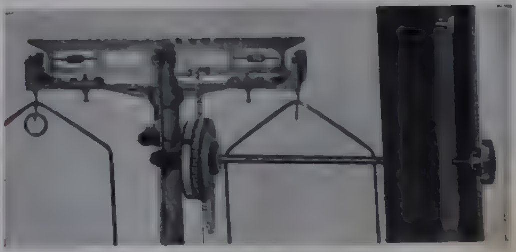
BC-038 **Balance case**, hardwood, fully glazed with slide-up front window. Suitable for balances BC-030 and BC-035. Internal dimensions, height 370 mm, width 395 mm, depth 208 mm ... ... Each **£4. 8. 0.** *m*

BC-040

BALANCE, student, *Gallenkamp*.
Capacity **250 g.** Sensitivity **1 mg.**
As BC-030 but with draught excluding glazed case with slide-up front window and right-hand side manipulator for the beam rider. Complete with 100 mg rider.
Each **£20. 10. 0.** *b*

BC-045

BALANCE, student, *Gallenkamp*.
Capacity **250 g.** Sensitivity **1 mg.**
As BC-040 but with right-hand side control for Grainger chain drum. The chain drum is scaled from 0 to 1 g in 0·01 g subdivisions and enables weight in this range to be added by the progressive addition of the weight of a precision chain ... ... Each **£24. 0. 0.** *b*



BC-045 beam and
Grainger drum assembly

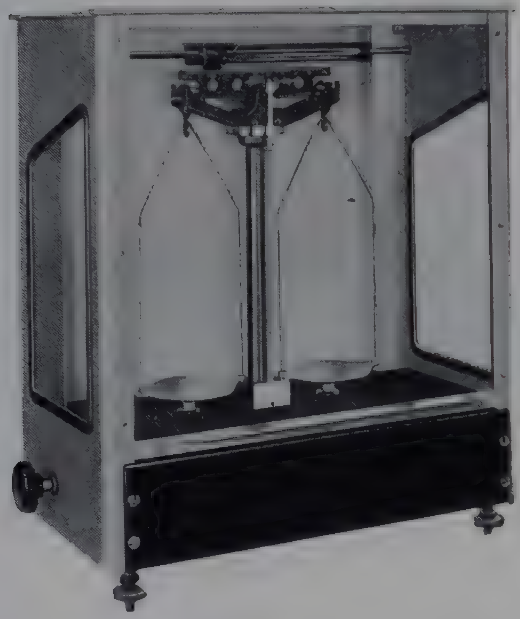
For suitable **Balance Weights, Forceps, etc.** see pages 54 to 56.

All items on this page normally available from stock.

STUDENT AND PRECISION BALANCES

BC-070

BC-076



BC-084

BC-088

BC-070

BALANCE, student, two pan.
Capacity **200 g.** Sensitivity **10 mg.**
Weighs to 1 g without external weights. Stainless steel pan diameter 10 cm, height of stirrup 12·5 cm. Totally enclosed beam with magnetic damping. Includes set of brass weights, 1 g to 100 g with forceps, in drawer below balance pans ... ... Each **£25. 0. 0.** *m*

BC-076

BALANCE, student, two pan, *Oertling* J10.
Capacity **250 g.** Sensitivity **5 mg.**
Weighs to 1 g without external weights. Stainless steel pan diameter 10 cm, height of stirrup 12·5 cm. Totally enclosed beam with oil damping. Includes set of brass weights, 1 g to 100 g with forceps, in drawer below balance pans ... ... Each **£25. 0. 0.** *f*

BC-080

BALANCE, student analytical, two pan, *Stanton* C26.
Capacity **200 g.** Sensitivity **0·1 mg.**
Chromium plated brass pan diameter 10 cm, height of stirrup 22 cm. With brass beam having 100 graduations for the 5 mg rider supplied. In grey cellulosed plywood case with hinged side doors and slide-up front.
Each **£55. 0. 0.** *f*

BC-084

BALANCE, student analytical, two pan, *Oertling* AO3.
Capacity **200 g.** Sensitivity **0·2 mg.**
Stainless steel pan diameter 9 cm, height of stirrup 20 cm. With brass beam having 100 graduations for the 5 mg rider supplied. In metal case with slide-up front.
Each **£65. 0. 0.** *f*

BC-088

BALANCE, semi-automatic precision, *Oertling* 71.
Capacity **2 kg.** Sensitivity **0·1 g.**
Rectangular stainless steel weighing pan 20 cm × 18 cm, weighing height 22 cm. With 12 cm scale calibrated 0 to 10 g in 0·1 g divisions. Mounted on vitreous enamelled cast iron base ... ... Each **£65. 0. 0.** *f*

For suitable **Balance Weights, Forceps,** etc. see pages 54 to 56.

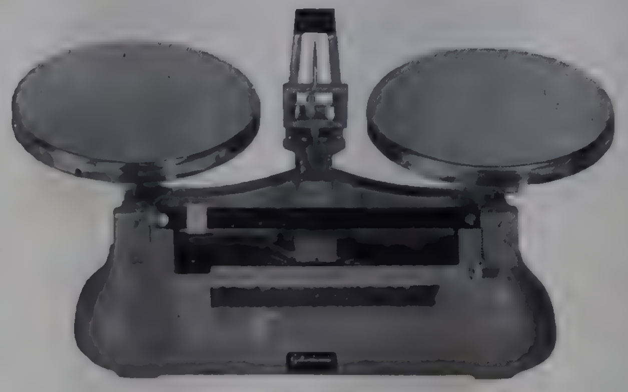
All items on this page normally available from stock.

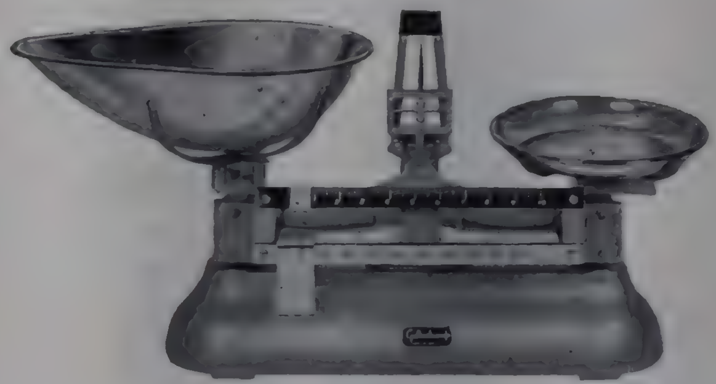
Gallenkamp SLIDING WEIGHT BALANCES

Strongly constructed beam balances, capacity 2 kg, sensitivity 0·1 g, fitted with two scales and the appropriate rider weights. One scale reads 0 to 10 g in 0·1 g and the other 0 to 200 g in 10 g. Weights are unnecessary for weighing up to 210 g.

List No.	Left-hand pan	Weight pan	Each	
BC-110	Stainless steel circular	Stainless steel circular	£13. 0. 0.	b
BC-111	Chromium plated scoop	Chromium plated circular	£15. 10. 0.	b
BC-112	Stainless steel scoop	Stainless steel circular	£25. 10. 0.	b

BC-115 **Set of weights**, for above balances, for weighing up to 2 kg, consisting of 100, 200, 500, and 1000 g weights in wood block ... ... Set £4. 6. 0. c


BC-110

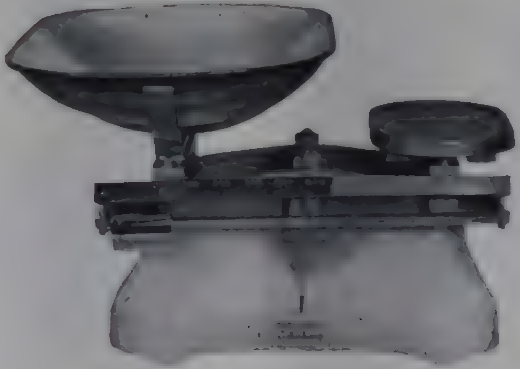

BC-111
BC-112

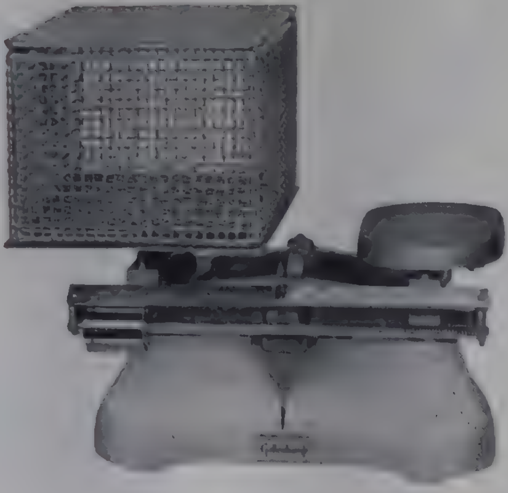
Gallenkamp ROTATING WEIGHT BALANCES

Strongly constructed beam balances, capacity 6 kg, sensitivity 0·5 g. Fitted with one scale 0 to 1000 g in 10 g and a rotating weight covering 0 to 10 g in 0·5 g divisions. Weights are unnecessary for weighing up to 1 kg. The rod carrying the rotating weight is threaded on the top only, allowing the weight to be moved rapidly along the scale by lifting slightly. With flat stove enamelled weight pan.

List No.	Left-hand pan		Each	
	Type	Dimensions		
BC-160	White porcelain flat	25×19 cm	£17. 10. 0.	b
BC-161	White enamelled iron scoop	38×25× 6 cm	£18. 0. 0.	b
BC-163	Flat iron with animal cage	25×20×15 cm	£23. 0. 0.	b

BC-165 **Set of weights**, for above balances, for weighing up to 6 kg, consisting of one 1 kg and two 2 kg iron weights. Set £1. 12. 0. c

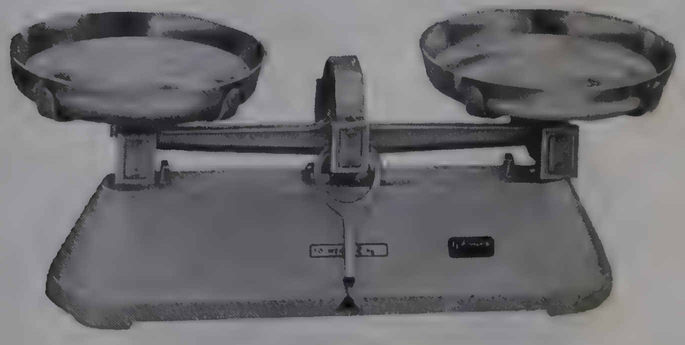

BC-161


BC-163

NOTE. As sliding weight and rotating weight balances have a zero adjustment weight they do not comply with the Weights and Measures regulations and are not suitable for weighing for sale purposes in the United Kingdom.

BALANCES,
Moisture see MOISTURE TESTING
Sedimentation see PARTICLE SIZE

All items on this page normally available from stock.



BC-170

BALANCE SCALES

BC-170

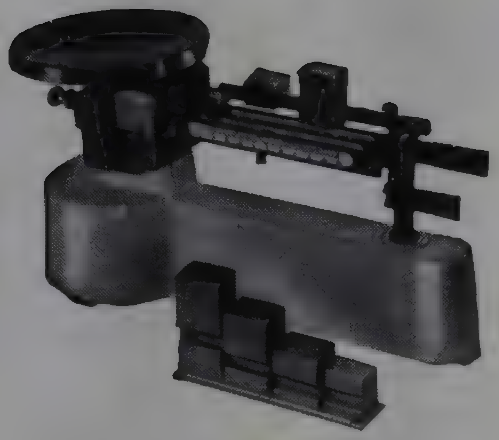
BALANCE SCALES, heavy duty. A soundly constructed beam balance mounted on heavy cast base with 225 mm dia. brass pans. The 2 and 5 kg models have single beam as illustrated. The 10 kg model has a double framed beam.

Capacity	2	5	10 kg	
Each	**£7. 5. 0.**	**£10.15. 0.**	**£11. 5. 0.**	*m*

BEAM BALANCES

BC-172

BALANCE, TRIPLE BEAM, with agate planes, steel knife edges and damped movement. Capacity 1110 g extended to 2110 g by supplementary weight. Beams calibrated 0–10 g by 1 g, subdivided 0·1 g, 0–100 g by 10 g and 0–1000 g by 100 g. With 200 mm dia. plastics pan. Each **£21.13. 0.** *m*



BC-172
BC-174

BC-174

BALANCE, TRIPLE BEAM, as BC-172 but capacity extended to 5110 g by use of four supplementary weights. Each **£24. 7. 6.** *m*

LEVER BALANCE

BC-185

BALANCE, lever pattern, rapid weighing with arc scale graduated 0–250 g in 1 g divisions. Heavy base casting with levelling screw and plated 10 cm pan suspended by stirrup. Overall dimensions 41 × 36 cm, weight 3·4 kg. ... ... Each **£12. 5. 0.** *m*

BC-185

Gallenkamp

SEDIMENTATION BALANCE

For Particle Size Analysis

- Full range 5μ to 75μ in 6 hours
- Illuminated read-out
- Operates on 0·5 g of sample
- Optional auto-recording system

For full details see PC-650 et seq. in List No. sequence.

All items on this page normally available from stock.

TORSION BALANCES

These torsion balances are fitted with jewelled bearings, hardened steel pivots and magnetic damping. The scale of 500 divisions extends about 250° (310 mm) and is fitted with inset mirror to avoid parallax errors.

Standard model as illustrated has a tripod base and a hinged cover to protect the beam and hook. It is accurate to ±0·5%.

Precision model is fitted in an enamelled steel case with a hinged enclosure for shielding the sample during weighing and a lever to facilitate rapid repetition weighing of constant amounts. It is accurate to ±0·2%.

All ranges of both models have hooks for suspending specimens, the 5 mg range also has a 10 mm pan.

Range 0 to	Standard model		Precision model		Check weights	
	List No.	Each	List No.	Each	List No.	Set of 4
5 mg	**BC-190**	£37. 3. 3. *mN*	**BC-225**	£60. 9. 9. *m*	**BC-250**	£1. 9. 3. *m*
50 mg	**BC-195**	£34.19. 6. *m*	**BC-230**	£58. 6. 0. *mN*	**BC-255**	£1. 9. 3. *m*
500 mg	**BC-200**	£29. 3. 0. *m*	**BC-235**	£52. 9. 6. *m*	**BC-260**	£1. 9. 3. *m*
1000 mg	**BC-210**	£34.19. 6. *m*	**BC-240**	£58. 6. 0. *mN*		
10 g	**BC-215**	£34.19. 6. *mN*	**BC-245**	£58. 6. 0. *mN*	—	—

BC-190 to BC-215

SPRING BALANCES

BC-490

BALANCE, spring, dual scale model in enamelled diecast case with taring adjustment and graduated plastics scoop. A double spring mechanism provides fine subdivisions in the lower range combined with a large capacity. The first section of the dial is divided every 10 g up to 500 g when the second spring comes into action and the remainder of the dial is divided every 25 g up to a total capacity of 5 kg. *Salter* No. 51.

Each **£3. 8. 0.** *m*

BC-492

BALANCE, spring, dual scale as BC-490 but for Imperial system weighing. Scale divided in ¼ oz up to 1 lb and in 1 oz up to 10 lb ... ... Each **£3.12.10.** *m*

BC-510

BALANCES, spring, in heavy metal case, with taring screw and circular tinned pan. *Salter* No. 50. Metric scale.

Capacity	10	20	kg
Divisions	50	50	g
Pan dia.	23	30	cm
Each	£4.14. 0.	£8. 3. 0.	*m*

BC-530

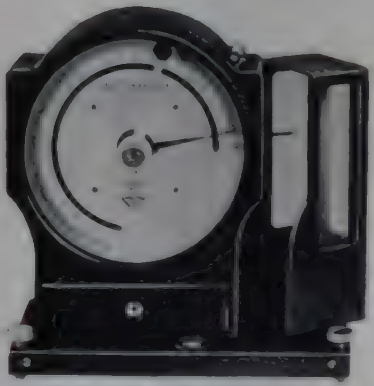
BALANCES, spring, with hook. *Salter* No. 10. Metric scale.

Capacity	50	100	200	500	1000 g	
Divisions	0·5	1	2	5	10 g	
Dozen	210/–	210/–	210/–	210/–	210/–	*m*
Each	19/–	19/–	19/–	19/–	19/–	

BC-532

BALANCES, spring, with hook. *Salter* No. 3. Imperial and metric scales.

Capacity	25	56	112 lb	
Divisions	0·5	1	1 lb	
Capacity	12	25	50 kg	
Divisions	0·25	0·5	0·5 kg	
Dozen	90/–	144/–	336/–	*m*
Each	8/6	13/3	30/6	



BC-225 to BC-245

BC-490
BC-492

BC-510

BC-530

BC-532

Items on this page normally available from stock except those coded *N*.

SPRING BALANCES

(continued)

BC-570
BC-572

BC-570

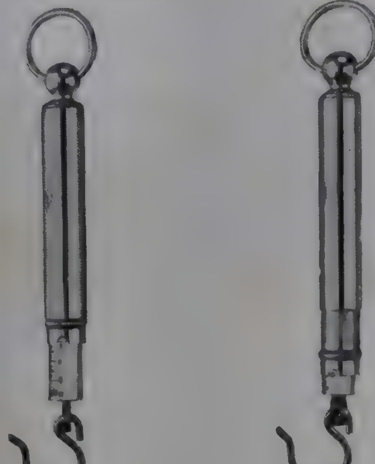
BALANCES, spring, in tubular brass case with hook. *Salter* No. 15. Metric scale.

Capacity	5	10	20 kg	
Divisions	100	200	200 g	
Each	**23/–**	**23/–**	**38/–**	*m*

BC-572

BALANCES, spring, as BC-570 but Imperial scale.

Capacity	4	8	10	20	20	30 lb	
Divisions	0·5	1	4	4	8	8 oz	
Each	**35/–**	**40/–**	**23/–**	**34/–**	**23/–**	**27/–**	*m*



Showing tare weight

Sleeve adjusted to new zero ready for net weighing

BC-580

BC-580

BALANCES, spring, with **adjustable taring sleeve** which can be set to compensate for the weight of the container and so permit a direct reading of the net object weight.

Capacity	4	16 lb	
Divisions	1	4 oz	
Taring range approx.	1	4 lb	
Dozen	**210/–**	**210/–**	*c*
Each	**19/–**	**19/–**	

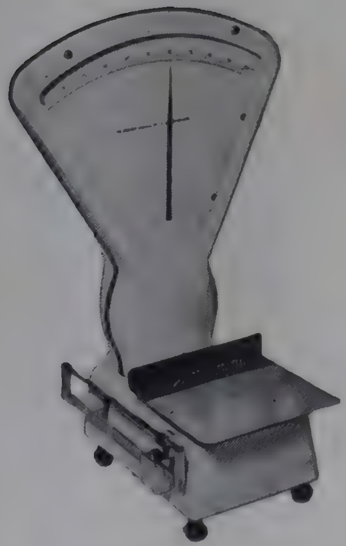
BC-590

BC-590

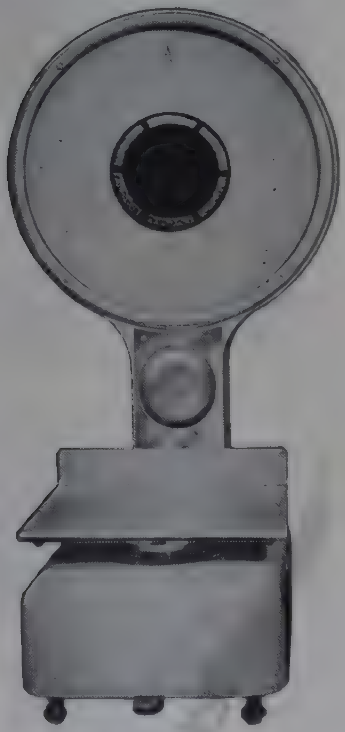
BALANCE, spring, heavy duty dial suspension type in enamelled case with taring adjustment, ring and hook. White enamel scale 15 cm dia. divided in 250 g up to 50 kg. *Salter* No. 235.

Each **£3. 17. 6.** *m*

HEAVY DUTY INDICATING BALANCES



BC-652
BC-654



BC-656
BC-658

BC-652

INDICATING BALANCE, heavy duty, sliding weight, range 0–2200 g, with chart reading 200×1 g. Fitted with tare beam for offsetting the weight of the container. Adjustable oil damping and adjustable levelling feet. Balance finished in white vitreous enamel with stainless steel plate 20×25 cm ... Each **£66. 10. 0.** *mN*

BC-654

INDICATING BALANCE, heavy duty, as BC-652 but range 0–5500 g, chart 500×2 g and plate 23×28 cm.

Each **£88. 10. 0.** *mN*

The above balances are also available with double-lipped stainless steel scoop. Details on application.

BC-656

INDICATING BALANCE, heavy duty, complete range 0–10 kg on one chart subdivided in 20 g. Adjustable levelling feet. Balance finished in white vitreous enamel with stainless steel plate 25×37 cm.

Each **£80. 15. 0.** *mN*

BC-658

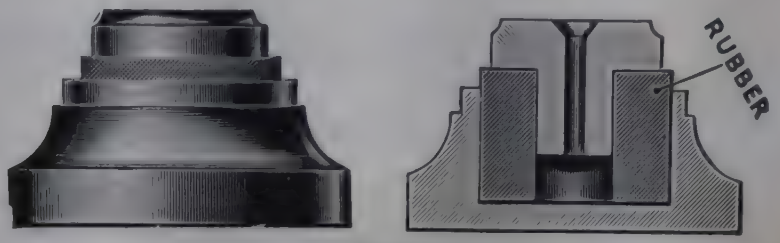
INDICATING BALANCE, heavy duty, as BC-656 but range 0–20 kg subdivided in 50 g. Each **£80. 15. 0.** *mN*

Items on this page normally available from stock except those coded *N*.

BD-120

BALANCE FEET, shock absorbing. Set of three feet each consisting of two turned brass members separated by soft rubber buffers to minimise vibration.

Dozen sets **£10. 5. 0.** Set **£0. 18. 6.** *b*



BD-120

BD-180

BALANCE PLATFORM, bench mounting, *Gallenkamp*. Provides adequate protection for balances and other sensitive instruments by damping virtually all vibration. The balance platform is enclosed in a polished wood case and has a flush top surface of laminated plastics sheet on a heavy cast metal plate which is suspended from a system of shock absorbers.

Overall	57 × 41 × 9 cm
Balance platform	45 × 30 cm
Weight	30 kg

Each **£25. 0. 0.** *b*

BD-180 with balance

BD-200

BALANCE TABLE, floor mounting, to provide a working surface which is free from the vibrations inherent in buildings. Ideal for mounting analytical balances, galvanometers, optical levers and other vibration sensitive instruments. The table comprises a set of stone slabs and a set of sundries. The top member and two side members (which are drilled to accept the bracing bar) are of 8 cm thick grey/green mottled terrazzo stone. The sundries comprise the bracing bar, washers and flanges, and a set of rubber shock-absorbing pads. Supplied with instructions for assembly.

Overall height	76 cm
Working surface	90 × 76 cm
Net weight approx.	300 kg

Each **£64. 10. 0.** *m*

BD-200

BALANCE ACCESSORIES in other parts of the catalogue

Counterpoise bottles or tubes	see	TW-600 or TW-650
Desiccators	see	DK-660
Spatulas	see	SJ-050 et seq.
Watch glasses	see	BA-974
Weighing bottles	see	WT-020 et seq.
Weighing funnels	see	WT-170
Weighing scoops	see	BA-976, WT-150

All items on this page normally available from stock.

BALANCE WEIGHTS

TOLERANCES ON ADJUSTMENT

Analytical weights with tolerances as specified by the National Physical Laboratory are suitable for use with high class analytical balances. For many analytical purposes a slightly lower quality is acceptable and can be provided at a considerably lower cost in the form of *Gallenkamp* analytical weights. For student and precision balances *Gallenkamp* general purpose weights are suitable. The tolerances specified for these three grades of weights are shown in the table below.

DENOMINATION		1 mg	2 mg	5 mg	10 mg	20 mg	50 mg	100 mg	200 mg	500 mg	1 g	2 g	5 g	10 g	20 g	50 g	100 g	200 g	500 g	1000 g	2000 g	5000 g
NPL	± mg	0·02	0·02	0·02	0·02	0·02	0·02	0·05	0·05	0·05	0·05	0·05	0·05	0·05	0·1	0·25	0·5	1·0	—	—	—	—
Gallenkamp analytical	± mg	0·05	0·1	0·1	0·1	0·1	0·1	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·4	1·0	2·0	4·0	—	—	—	—
Gallenkamp general purpose	± mg	—	—	—	1	1	1	1	1	1	2	3	4	6	10	15	20	30	50	100	200	500

BD-520

BD-540

OERTLING ANALYTICAL WEIGHTS

BD-520
BALANCE WEIGHTS, MICROCHEMICAL, *Oertling*, stainless steel. In polished mahogany boxes lined with velvet, with tipped forceps. Weights are checked to at least half NPL tolerance and interchecked to prevent cumulative errors. Complete with fractions and three 5 mg riders. NPL certificates at extra cost. 10 mg to 20 g arranged on 1–1–2–5 system. Set **£24**. **0**. **0**. *f*

BD-540
BALANCE WEIGHTS, ANALYTICAL, *Oertling*, stainless steel. In two tone plastics case, with stainless steel strip fractions and plastics forceps. Weights are checked to NPL tolerance and interchecked to prevent cumulative errors. With works certificate. 10 mg to 100 g arranged on 1–1–2–5 system. Set **£18**. **0**. **0**. *fS*

BD-542
BALANCE WEIGHTS, ANALYTICAL, *Oertling*, stainless steel, as BD-540 but without fractional weights. 1 g to 100 g arranged on 1–1–2–5 system. Set **£17**. **0**. **0**. *f*

BD-560

STANTON ANALYTICAL WEIGHTS

BD-550
BALANCE WEIGHTS, MICROCHEMICAL, *Stanton*, stainless steel. In polished mahogany boxes lined with velvet, with tipped forceps. Weights are specially adjusted to well within NPL tolerances, and a works certificate is supplied with each set. Stainless steel fractions of geometrical wire pattern. 10 mg to 20 mg arranged on 1–2–3–5 system ... ... Set **£21**. **0**. **0**. *f*

BD-560
BALANCE WEIGHTS, ANALYTICAL, *Stanton*, stainless steel. In polished mahogany box lined with velvet, with tipped forceps and glass cover over stainless steel fractions. Weights are checked to within NPL tolerances, and a works certificate is supplied with each set. 10 mg to 100 g arranged on 1–2–3–5 system. Set **£18**. **5**. **0**. *fS*

BD-565
BALANCE WEIGHTS, ANALYTICAL, *Stanton*, stainless steel, as BD-560 but without fraction weights. For use with balances having mechanical fraction weight loading. 1 g to 100 g arranged on 1–2–3–5 system. Set **£15**. **5**. **0**. *f*

Items on this page coded S normally available from stock.

Gallenkamp ANALYTICAL WEIGHTS

Tolerances see table on opposite page.

BD-608
BALANCE WEIGHTS, ANALYTICAL, *Gallenkamp*, stainless steel with aluminium and nickel silver fractions. In plastics box with stainless steel forceps. Weights arranged on 1–2–2–5 system.

10 mg to	50	100 g	
Each	**£8. 5. 0.**	**£9. 0. 0.**	*b*

BD-609
BALANCE WEIGHTS, ANALYTICAL, *Gallenkamp*, stainless steel, as BD-608 but without fraction weights. For use with balances having mechanical fraction weight loading. In plastics box with stainless steel forceps. 1 g to 100 g arranged on 1–2–2–5 system.
Each **£8. 5. 0.** *b*

BD-614
BALANCE RIDERS, ANALYTICAL, *Gallenkamp*, platinum wire.

Weight	5	10 mg	
Dozen	**64/–**	**64/–**	*b*
Each	**6/6**	**6/6**	

BD-630
BALANCE WEIGHT FORCEPS, nickel plated brass with curved ends, length 9 cm.
Dozen **£1. 2. 0.** Each **£0. 3. 5.** c

BD-632
BALANCE WEIGHT FORCEPS, stainless steel, with curved ivory tips, length 9 cm.
Dozen **£10. 0. 0.** Each **£0. 18. 0.** c

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

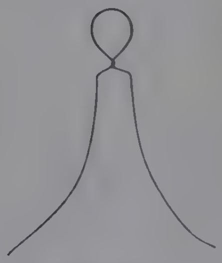
We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

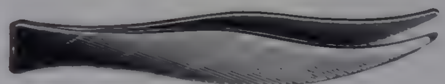
Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

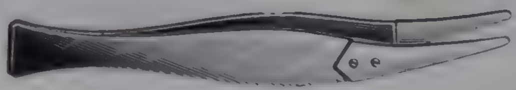
Instead we have introduced a price structure which retains the advantageous rates for standard packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'dozen' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about 50/0d. per dozen.

This system is intended to encourage ordering in standard packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

BD-608


BD-614


BD-630


BD-632

All items on this page normally available from stock.

Gallenkamp GENERAL PURPOSE WEIGHTS

BD-650

Tolerances see table on page 54.

BD-650

BALANCE WEIGHTS, GENERAL PURPOSE, *Gallenkamp*, polished brass, aluminium and nickel-silver fractions. Set of weights arranged on 1–2–2–5 system in ivory plastics box with unbreakable glass cover for the fractions, and forceps.

1 mg to	100	200 g	
Dozen	**£32. 0. 0.**	**£40. 0. 0.**	*b*
Each	**£2. 18. 0.**	**£3. 12. 0.**	

BD-660

BALANCE WEIGHTS, GENERAL PURPOSE, *Gallenkamp*, polished brass. Set of weights without fractions arranged on 1–2–2–5 system, in polished hardwood box.

1 g to	500	1000	2000	5000 g	
Each	**£5. 0. 0.**	**£7. 5. 0.**	**£11. 10. 0.**	**£29. 0. 0.**	*b*

BD-660

BD-670

BALANCE WEIGHTS, GENERAL PURPOSE, *Gallenkamp*, polished brass. Loose weights as used in sets BD-650 and BD-660.

Weight	1	2	5	10	20	50	100 g	
Dozen	**10/–**	**11/–**	**14/–**	**18/6**	**24/–**	**40/–**	**74/–**	*b*
Each	**2/6**	**2/7**	**2/10**	**3/2**	**3/7**	**4/9**	**7/4**	

Weight	200	500	1000	2000	5000 g	
Dozen	**125/–**	**205/–**	**380/–**	**720/–**	**1680/–**	*b*
Each	**11/3**	**18/6**	**35/–**	**66/–**	**155/–**	

BD-672

BALANCE WEIGHTS, fractions, *Gallenkamp*, general purpose. Loose fraction, 1 mg to 5 mg aluminium and 10 mg to 500 mg nickel-silver, as used in sets BD-650.

Weight	1	2	5	10	20 mg	
Gross	**60/–**	**60/–**	**60/–**	**60/–**	**60/–**	*b*
Dozen	**6/4**	**6/4**	**6/4**	**6/4**	**6/4**	

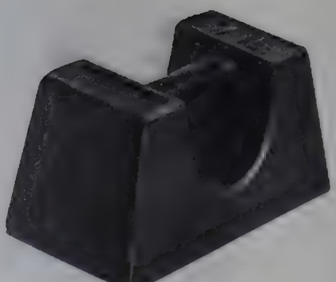
Weight	50	100	200	500 mg	
Gross	**60/–**	**90/–**	**90/–**	**90/–**	*b*
Dozen	**6/4**	**8/6**	**8/6**	**8/6**	

BD-680

BALANCE WEIGHTS, fractions, *Gallenkamp*, general purpose. 10–500 mg nickel-silver fractions with 10 and 100 mg in duplicate, in box with hinged lid.

Dozen **£6. 10. 0.** Each **£0. 11. 9.** *b*

BD-740



BD-760

HEAVY DUTY WEIGHTS

BD-740

BALANCE WEIGHTS, heavy duty, circular flat form. ¼ to 2 oz in brass, 4 oz to 4 lb in iron. Board of Trade stamped ... ... Set of 9 **£2. 5. 0.** *c*

BD-760

BALANCE WEIGHTS, heavy duty, iron with bar handles. Board of Trade stamped.

Weight	1	2	4	7	14 lb	
Dozen	**94/–**	**120/–**	**150/–**	**170/–**	**300/–**	*c*
Each	**8/9**	**11/–**	**13/6**	**15/6**	**27/–**	

All items on this page normally available from stock.

BE-350

BE-380

BE-350

BAROMETER, direct reading, *Darton*, with compensated silvered metal scales on metal reflector, and thermometer. Mounted on polished board.

Each **£15. 8. 6.** *m*

BE-380

BAROMETER, Fortin, *Darton*, designed for school and college laboratories, suitable also for amateur meteorologists. With silvered metal scales, range 26–32 in and 660–810 mm, on black enamelled square frame with opal reflector and thermometer graduated in °C, mounted on polished board. Vernier reading to 0·002 in and 0·05 mm. Bore of tube 7 mm nominal ... Each **£35.15. 0.** *m*

Suitable case see BE-410.

BE-400

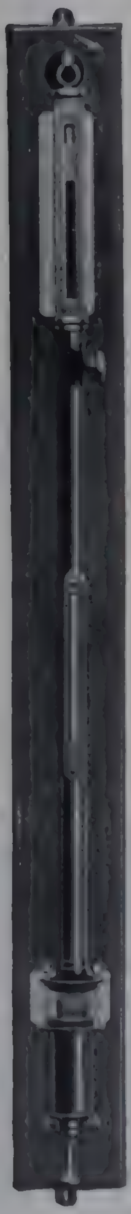
BAROMETERS, Fortin, *Darton*, with engine divided scales to 0·05 in and 1 mm. Scale reading range 26·5 in to 32·5 in and 675–820 mm. Vernier readings to 0·002 in and 0·05 mm, complete with attached thermometer graduated in °C, on polished board, with reflector.

Bore of tube (nominal)	7	8	13 mm	
Each	**£44. 4. 0.**	**£72. 0. 0.**	**£87. 6. 6.**	*m*

BE-410

BAROMETER CASES, polished hardwood, with glass side panels and front-opening door. For barometers BE-380 and BE-400.

Bore of tube	7	8	13 mm	
Each	**£11. 5. 0.**	**£12. 0. 0.**	**£12. 2. 6.**	*m*



BE-400

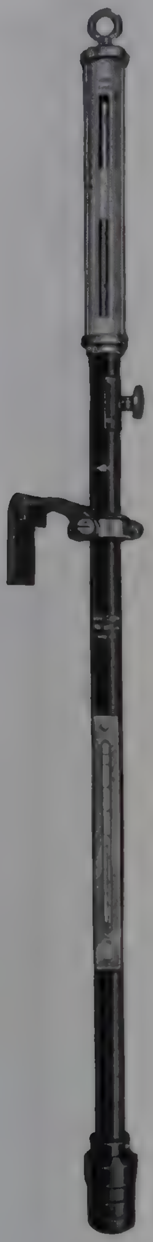
BE-410

Barometers BE-380, BE-400 and BE-430 are graduated in accordance with the standard conventions detailed in British Standard 2520.

All items on this page normally available from stock.

1000
29
30
CHANGE
RAIN
Compensated
FAIR
INCHES
Feet
28
31
27
23
26
25
24
2000
3000
4000
5000
6000
7000
8000
Made in England

BE-450



BE-430

BE-430

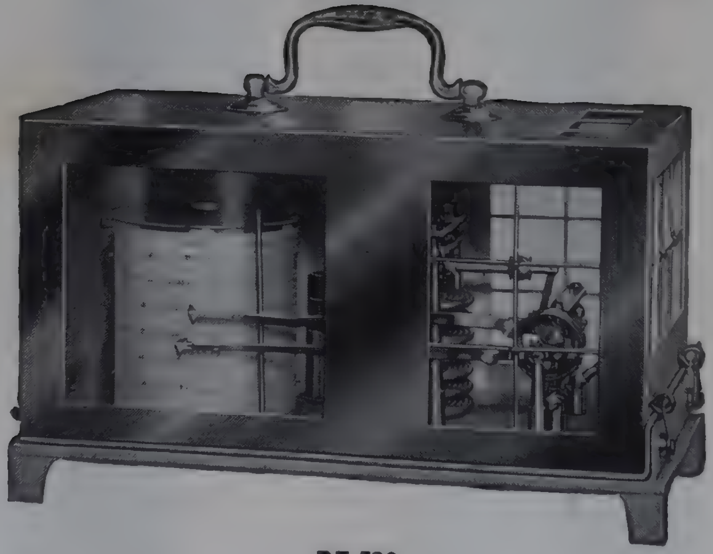
BAROMETER, Standard Station, Kew type, *Darton* (Board of Trade pattern), scale range 26·5–32·5 in and 675–820 mm, with Vernier reading to 0·002 in, 0·05 mm. Complete with attached thermometer reading in °C and short arm and gimbal suspension. Bore of tube 6 mm ... ... Each **£48. 10. 0.** *m*

SPECIAL NOTICE—Mercury barometers are liable to damage in transit. Whenever possible we deliver in our own vans and accept all responsibility. When this is not possible we take all reasonable precautions and advise sending by passenger train 'in care of the guard', suitably insured, and for customer to meet the train on arrival. For export, we recommend 'special stowage', hung in officer's cabin.

BE-450

BAROMETER, aneroid, watch form, with 4 cm dial scaled 23 to 31 inches in 0·05 inch divisions, and revolving altitude scale to 8000 ft in 100 ft divisions.

Each **£13. 5. 0.** *cS*



BE-520

THERMOGRAPHS see TK-100 et seq. in List No. sequence.

BE-500

BAROGRAPH, *Darton*, with seven vacuum capsule movement and recording drum operated by 7-day clock for weekly recording. In heavy copper hinged case with glass window mounted on cast base. Complete with bottle of ink and 52 charts scaled 7 days, 950–1050 mb.

Each **£40. 12. 6.** *m*

BE-520

BAROTHERMOGRAPH, *Darton*, for recording pressure and temperature on the same chart. This instrument has a similar barometer movement to BE-500, with the addition of a bimetallic temperature recording element. With clockwork movement for 7-day charts. Complete with two bottles of ink and 52 charts scaled 20–120°F and 950–1050 mb ... ... Each **£49. 2. 6.** *m*

Items on this page coded *S* normally available from stock.

GLASS BASINS

BH-030

BASINS, evaporating, *Pyrex brand* glass, round bottom with spout.

Capacity approx.	40	75	100	250 ml
Diameter	65	78	90	120 mm
Height	30	40	45	60 mm
Std. pack qty.	36	36	36	18

Std. pack	**108/–**	**116/–**	**121/–**	**75/–**	*d*
Dozen	**37/–**	**40/–**	**42/–**	**51/–**	
Each	**4/6**	**4/9**	**4/11**	**5/8**	

BH-040

BASINS, evaporating, *Pyrex brand* glass, flat bottom with spout.

Capacity approx.	25	100	150	200 ml
Diameter	60	80	90	105 mm
Height	25	45	50	55 mm
Std. pack qty.	36	72	72	48

Std. pack	**97/–**	**232/–**	**243/–**	**176/–**	*d*
Dozen	**34/–**	**41/–**	**43/–**	**47/–**	
Each	**4/4**	**4/10**	**5/–**	**5/4**	

Capacity approx.	350	700	1500 ml
Diameter	125	150	200 mm
Height	65	80	100 mm
Std. pack qty	36	24	18

Std. pack	**178/–**	**165/–**	**206/–**	*d*
Dozen	**62/–**	**84/–**	**140/–**	
Each	**6/4**	**8/–**	**12/9**	

BH-070

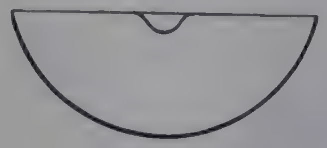
BASINS, crystallising, *Pyrex brand* glass, flat bottom, without spout.

Capacity approx.	150	175	250	375 ml
Diameter	70	80	94	102 mm
Height	50	40	50	50 mm
Std. pack qty	24	24	18	18

Std. pack	**65/–**	**77/–**	**61/–**	**66/–**	*d*
Dozen	**33/–**	**39/–**	**41/–**	**45/–**	
Each	**4/3**	**4/9**	**4/10**	**5/2**	

Capacity approx.	650	1200	1850	2500 ml
Diameter	125	150	170	190 mm
Height	65	75	90	100 mm
Std. pack qty	12	8	8	6

Std. pack	**59/–**	**55/–**	**82/–**	**75/–**	*d*
Each	**6/2**	**7/10**	**11/5**	**13/11**	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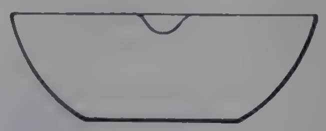
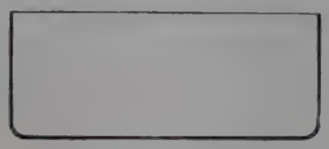
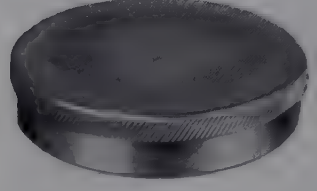
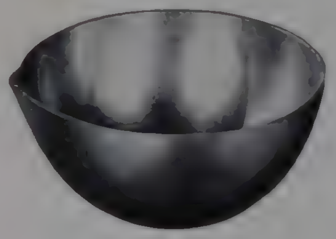
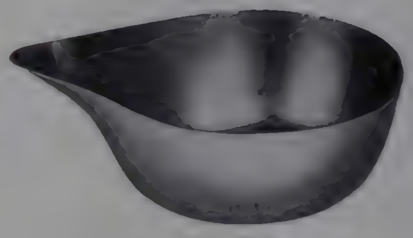

BH-040


BH-070


BH-185


BH-200


BH-205

METAL BASINS

BH-185

BASINS, aluminium, with well-fitting lid, for the determination of moisture in coal as specified in BS 1016 Part 1.

Diameter	22	35	65 mm
Depth	14	14	14 mm

Dozen	**39/–**	**40/–**	**48/–**	c
Each	**4/9**	**4/9**	**5/4**	

MV-470 **Minimum free space oven** for determination of moisture in coal. For details see entry in List No. sequence.

BH-200

BASINS, nickel, round bottom with spout, suitable for use with alkalis, water analysis, etc.

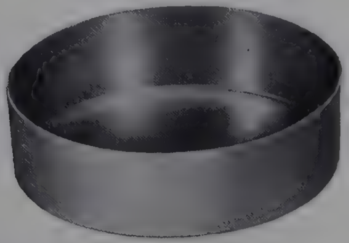
Diameter	5	6	8	10	14·5	20 cm	
Dozen	**49/–**	**59/–**	**90/–**	**118/–**	**230/–**	**340/–**	*m*
Each	**5/6**	**6/2**	**8/6**	**10/9**	**21/–**	**31/–**	

BH-205

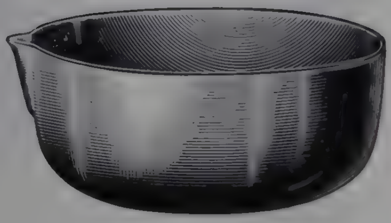
BASIN, nickel, with large spout, for sugar analysis, 7·5 cm diameter. Dozen **£8. 5. 0.** Each **£0. 15. 0.** *m*

All items on this page normally available from stock.

METAL BASINS
(continued)


BH-220

BH-230


BH-260

BH-220

BASINS, nickel, flat form, without spout, for milk analysis, etc.

Diameter	55	70	85 mm	
Depth	19	19	30 mm	
Dozen	**42/–**	**60/–**	**84/–**	*m*
Each	**4/11**	**6/4**	**8/–**	

BH-230

BASINS, nickel, flat form, with drop-on cover with knob.

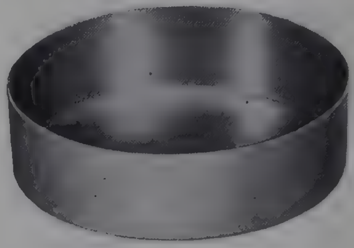
Diameter	60	90 mm	
Depth	16	16 mm	
Dozen	**100/–**	**160/–**	*m*
Each	**9/3**	**14/6**	

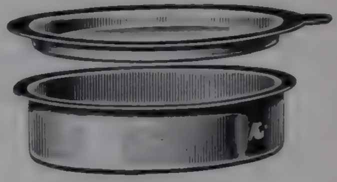
BH-260

BASINS, platinum, with spout, dimensions nominal.

Capacity	35	50	60	75	100 ml	
Diameter	50	53	58	65	70 mm	
Approx. weight	14	18	24	28	37 g	
Prices on application						*fN*

Capacity	150	250	500	750 ml	
Diameter	78	95	124	140 mm	
Approx. weight	55	90	172	210 g	
Prices on application					*fN*


BH-280


BH-285

BH-280

BASIN, stainless steel, polished, for milk analysis, 70 mm dia. 15 mm deep.

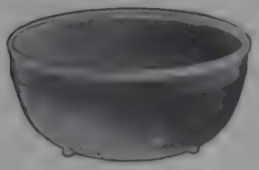
Dozen **£4. 12. 0.** Each **£0. 8. 9.** *c*

BH-285

BASIN, stainless steel, polished, for condensed milk analysis, 85 mm dia., 22 mm high, with drop-in lid, with projecting handle at one side.

Dozen **£7. 10. 0.** Each **£0. 13. 6.** *c*

PLASTICS BASINS

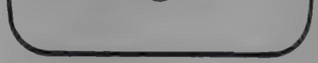

BH-345

BH-345

BASINS, polypropylene, without spout.

Capacity nominal	200	700	1500	3000 ml	
Diameter nominal	100	150	200	250 mm	
Dozen	**25/–**	**33/–**	**65/–**	**98/–**	*c*
Each	**3/8**	**4/3**	**6/8**	**9/–**	

PORCELAIN BASINS


BH-400

BH-400

BASINS, evaporating, *Royal Worcester* porcelain, flat form, with lip, glazed inside and out.

No.	1	2	2b	3	4	5	6	
Capacity	50	75	100	140	175	300	450 ml	
Diameter	75	85	95	100	110	125	147 mm	
Dozen	**40/–**	**49/–**	**66/–**	**75/–**	**83/–**	**106/–**	**128/–**	*d*
Three	**10/6**	**13/–**	**17/6**	**20/–**	—	—	—	
Each	**4/9**	**5/6**	**6/8**	**7/4**	**8/–**	**9/9**	**11/9**	

Items on this page normally available from stock except those coded *N.*

PORCELAIN BASINS
(continued)

BH-420

BASINS, evaporating, *Royal Worcester* porcelain, shallow form, with lip, sizes up to and including No. 5 glazed inside and out, other sizes unglazed on lower portion outside.

No.	00	0	1	2	3	
Capacity	75	85	125	150	225 ml	
Diameter	75	85	90	95	109 mm	
Dozen	**34/–**	**43/–**	**47/–**	**60/–**	**70/–**	*d*
Three	**9/3**	**11/3**	**12/3**	**16/–**	**18/6**	
Each	**4/4**	**5/–**	**5/4**	**6/4**	**7/–**	

No.	4	5	6	6b	
Capacity	250	375	550	850 ml	
Diameter	115	127	157	178 mm	
Dozen	**80/–**	**104/–**	**124/–**	**176/–**	*d*
Each	**7/10**	**9/6**	**11/5**	**16/1**	

No.	7	8	8a	9	
Capacity	1100	1600	1900	3000 ml	
Diameter	200	225	245	280 mm	
Dozen	**203/–**	**308/–**	**336/–**	**456/–**	*d*
Each	**18/7**	**28/3**	**31/–**	**41/9**	

BH-430

BASINS, evaporating, *Royal Worcester* porcelain, deep form, with lip, glazed inside and out.

No.	5/0	4/0	3/0	00	00a	
Capacity	13	50	75	175	250 ml	
Diameter	42	63	73	95	100 mm	
Dozen	**21/–**	**24/–**	**35/–**	**54/–**	**72/–**	*d*
Three	**6/4**	**7/–**	**9/3**	**14/3**	**19/–**	
Each	**3/4**	**3/7**	**4/5**	**5/10**	**7/2**	

No.	0	1	2	3	
Capacity	350	650	1200	1700 ml	
Diameter	105	150	185	200 mm	
Dozen	**86/–**	**121/–**	**165/–**	**216/–**	*d*
Each	**8/3**	**11/1**	**15/–**	**19/9**	

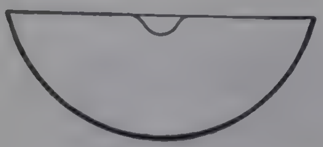
BH-460

BASINS, with handle (casseroles) *Royal Worcester* porcelain, with lip.

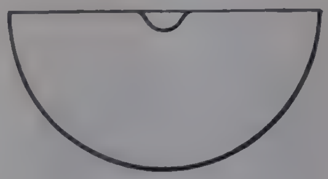
No.	2	3	4	5	
Capacity	80	175	400	700 ml	
Diameter	70	90	115	140 mm	
Dozen	**86/–**	**119/–**	**198/–**	**264/–**	*d*
Each	**8/3**	**10/11**	**18/–**	**24/2**	

BASINS, special purpose, will be found under the following headings

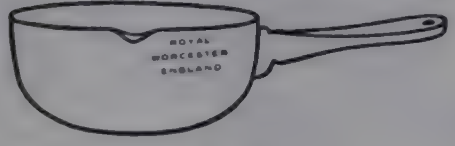
Ignition capsules	see	DISHES
Petri dishes	see	CULTURE
Sand bath dishes	see	SAND BATHS



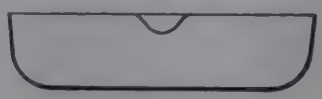
BH-420
BH-510



BH-430
BH-521



BH-460



BH-500

SILICA BASINS

BH-500

BASINS, evaporating, *Vitreosil,* translucent fused silica, flat form, glazed, with spout.

No.	F1	F2	F5	F3	F4	
Capacity	20	25	60	75	125 ml	
Diameter	69	78	94	100	130 mm	
Height	15	15	24	20	23 mm	
Pack of 10	**136/–**	**144/–**	**158/–**	**177/–**	**242/–**	*m*
Each	**15/2**	**16/2**	**17/9**	**19/7**	**27/–**	

BH-510

BASINS, evaporating, *Vitreosil,* translucent fused silica, shallow form, glazed, with spout.

No.	B1	B3	B5	B9	B10	
Capacity	20	45	70	100	200 ml	
Diameter	55	75	87	100	113 mm	
Height	23	27	33	38	47 mm	
Pack of 10	**118/–**	**136/–**	**144/–**	**191/–**	**220/–**	*m*
Each	**13/1**	**15/2**	**16/2**	**21/2**	**24/6**	

BH-521

BASINS, evaporating, *Vitreosil,* translucent fused silica, deep form, glazed inside only, with spout.

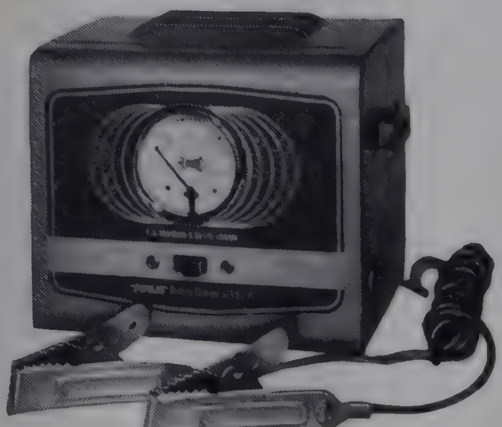
No.	B11	B12	B17	
Capacity	400	500	800 ml	
Diameter	142	137	187 mm	
Height	62	66	70 mm	
Pack of 10	**354/–**	**376/–**	**477/–**	*m*
Each	**39/5**	**42/–**	**52/11**	

BATHS

Chill	see	WATER BATHS
Embedding	see	HISTOLOGY
Extraction	see	EXTRACTION APPARATUS
Germination	see	SEED TESTING
Oil	see	OIL BATHS
Sand	see	SAND BATHS
Thermostatic Water	see	WATER BATHS
Viscometer	see	VISCOMETERS

All items on this page normally available from stock.

BJ-160 to BJ-166



BJ-240

BATTERIES

(Accumulators, secondary cells)

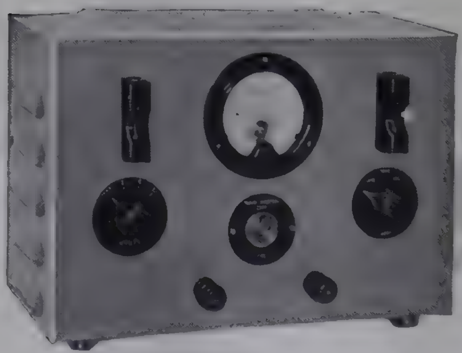
BATTERIES, *Exide* multi-plate type. Single 2V cells in glass containers, supplied dry and uncharged. BJ-164 and BJ-166 are fitted with loose carrying handles.

List No.	Type	A.h. capacity at 20 h rate	Overall dimensions mm W.	L.	H.	Each	
BJ-160	LCG2	20	127	60	203	**£1. 15. 0.**	*m*
BJ-162	LCG4	40	127	90	203	**£2. 7. 6.**	*m*
BJ-164	LCG6	60	127	125	203	**£3. 2. 6.**	*m*
BJ-166	LCG8	80	127	154	203	**£3. 17. 6.**	*m*

BATTERIES, *Mallory* **voltage reference, see EF-490 in List No. sequence**

BJ-245

BJ-250



BJ-256

BATTERY CHARGERS

BJ-240

BATTERY CHARGER for 6 and 12V batteries, charging at 1·5A max. The double wound, impregnated transformer, selenium rectifier and clear scale ammeter are housed in a louvred steel case designed for wall and bench mounting. Supplied with connecting leads and clips. For 200/250V 50 Hz single phase supplies.

Each **£3. 19. 6.** *m*

BJ-245

BATTERY CHARGER, as BJ-240, but charging at up to 3A ... ... Each **£6. 5. 0.** *m*

BJ-250

BATTERY CHARGER, as BJ-240, but charging at up to 5A ... ... Each **£7. 19. 0.** *m*

BJ-256

BATTERY CHARGER, for 2V, 6V and 12V batteries charging at 1 to 5A. Consisting of a transformer, rectifier, fuses and ammeter in a metal case, complete with mains input cable and shrouded output terminals. Overall dimensions 20 × 28 × 18 cm. Net weight 6 kg. For 200/250V 50 Hz single phase supplies.

Each **£13. 5. 0.** *m*

All items on this page normally available from stock.

TALL FORM BEAKERS

BJ-620

BEAKERS, tall form, without spout, *Firmasil* glass.

Capacity	25	50	100	150	250	400 ml	
Std. pack qty.	144	144	96	84	72	72	
Std. pack	289/–	289/–	192/–	206/–	176/–	203/–	d
Dozen	26/9	26/9	26/9	32/9	32/9	37/6	
Each	3/10	3/10	3/10	4/3	4/3	4/7	

Capacity	600	800	1000	2000	3000 ml	
Std. pack qty.	60	36	36	12	10	
Std. pack	213/–	176/–	176/–	115/–	151/–	d
Dozen	47/3	65/6	65/6	—	—	
Each	5/4	6/8	6/8	10/8	16/9	

BJ-625

BEAKERS, tall form, without spout, *Pyrex brand* glass.

Capacity	50	100	150	250	400	500 ml	
Std. pack qty.	144	96	96	72	72	60	
Std. pack	302/–	216/–	223/–	178/–	227/–	202/–	d
Dozen	28/–	29/–	30/–	32/–	40/–	43/–	
Each	3/10	3/11	4/–	4/2	4/10	5/–	

Capacity	600	800	1000	2000	3000 ml	
Std. pack qty.	72	48	36	12	12	
Std. pack	270/–	219/–	208/–	116/–	181/–	d
Dozen	48/–	57/–	72/–	—	—	
Each	5/4	6/2	7/2	10/9	16/9	

BJ-635

BEAKERS, tall form, without spout, *Davisil* glass.

Capacity	100	250	400	600	1000 ml	
Std. pack qty.	24	12	12	12	12	
Std. pack	54/–	32/6	37/6	45/9	62/9	d
Dozen	27/6	—	—	—	—	
Each	3/10	4/3	4/7	5/2	6/6	

MK-050

BEAKERS, micro. See entry in List No. sequence.

SQUAT FORM BEAKERS

BJ-650

BEAKERS, squat form, with spout, *Firmasil* glass.

Capacity	25	50	100	150	250	400 ml	
Std. pack qty.	144	144	120	84	72	60	
Std. pack	289/–	289/–	241/–	206/–	176/–	169/–	d
Dozen	26/9	26/9	26/9	32/9	32/9	37/6	
Each	3/10	3/10	3/10	4/3	4/3	4/7	

Capacity	500	600	800	1000	2000	3000 ml	
Std. pack qty.	60	60	36	36	12	12	
Std. pack	196/–	213/–	176/–	176/–	115/–	181/–	d
Dozen	43/6	47/3	65/6	65/6	—	—	
Each	5/–	5/4	6/8	6/8	10/8	16/9	

BJ-620 to BJ-635

BJ-650 to BJ-670

BJ-655

BEAKERS, squat form, with spout, *Pyrex brand* glass.

Capacity	50	100	150	250	400 ml	
Std. pack qty.	144	120	96	96	60	
Std. pack	302/–	270/–	223/–	237/–	189/–	d
Dozen	28/–	29/6	30/–	32/–	40/–	
Each	3/10	4/–	4/–	4/2	4/9	

Capacity	500	600	800	1000	1500 ml	
Std. pack qty.	60	60	48	36	24	
Std. pack	202/–	225/–	219/–	208/–	194/–	d
Dozen	43/–	48/–	58/–	72/–	100/–	
Each	5/–	5/4	6/2	7/2	9/3	

Capacity	2000	3000	4000	5000 ml	
Std. pack qty.	12	12	12	6	
Std. pack	123/–	181/–	227/–	132/–	d
Each	11/5	16/9	21/–	24/6	

BJ-665

BEAKERS, squat form, with spout, *Davisil* glass.

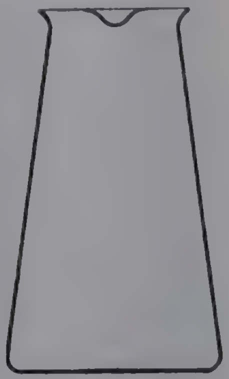
Capacity	50	100	150	250	400 ml	
Std. pack qty.	24	24	24	12	12	
Std. pack	54/–	54/–	64/–	32/6	37/6	d
Dozen	27/6	27/6	32/6	—	—	
Each	3/10	3/10	4/3	4/3	4/7	

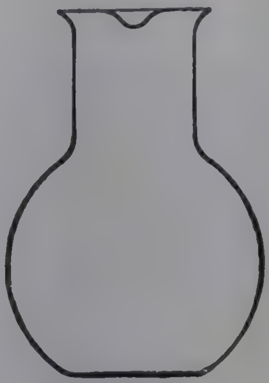
Capacity	500	600	1000	2000	5000 ml	
Std. pack qty.	12	12	12	4	4	
Std. pack	42/3	45/9	62/9	38/–	90/–	d
Each	4/11	5/2	6/6	10/–	23/6	

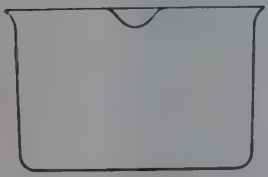
QUANTITY DISCOUNTS for glassware in bulk quantities, see details under 'Conditions of Sale'.

All items on this page normally available from stock.

MISCELLANEOUS BEAKERS


BJ-690
BJ-695


BJ-725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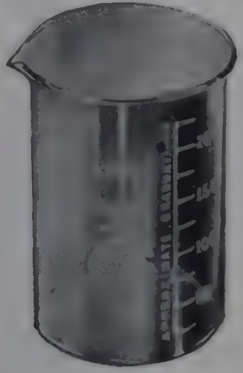

BJ-775

BJ-670

BEAKERS, squat form, with spout, *Vitreosil* translucent fused silica.

Capacity	250	500 ml	
Pack of 10	**433/–**	**587/–**	*mN*
Each	**48/3**	**65/3**	

For illustration see previous page.

QUANTITY DISCOUNTS for glassware in bulk quantities, see details under 'Conditions of Sale'.

BJ-690

BEAKERS, conical form, wide mouth, with spout, *Firmasil* glass.

Capacity	250	400	600	800	1000 ml	
Std. pack qty.	72	60	48	48	36	
Std. pack	**196/–**	**169/–**	**183/–**	**253/–**	**206/–**	*d*
Dozen	**36/3**	**37/6**	**51/–**	**70/3**	**76/3**	
Each	**4/6**	**4/7**	**5/6**	**7/–**	**7/6**	

BJ-695

BEAKERS, conical form, wide mouth, with spout, *Pyrex brand* glass.

Capacity	125	250	300	400 ml	
Std. pack qty.	96	72	72	72	
Std. pack	**273/–**	**254/–**	**264/–**	**291/–**	*d*
Dozen	**37/–**	**45/–**	**47/–**	**52/–**	
Each	**4/6**	**5/2**	**5/4**	**5/8**	

Capacity	500	650	800	1000 ml	
Std. pack qty.	60	48	48	36	
Std. pack	**274/–**	**255/–**	**288/–**	**243/–**	*d*
Dozen	**58/–**	**68/–**	**76/–**	**84/–**	
Each	**6/2**	**6/10**	**7/6**	**8/–**	

BJ-725

BEAKER FLASKS, with spout, *Pyrex brand* glass.

Capacity	200	400	500 ml	
Std. pack qty.	36	36	36	
Std. pack	**121/–**	**154/–**	**178/–**	*d*
Dozen	**42/–**	**53/–**	**62/–**	
Each	**4/11**	**5/8**	**6/4**	

BJ-740

BEAKERS, Baco, squat form, with spout, *Pyrex brand* glass, 460 ml capacity.

Std. pack of 24 **£5. 10. 0.** *d*
Dozen **£2. 16. 0.** Each **£0. 6. 0.**

BJ-775

BEAKERS, graduated, squat form, with spout, *Pyrex brand* glass.

Capacity	250	400	600 ml	
Subdivisions	25	25	25 ml	
Std. pack qty.	12	12	12	
Std. pack	**37/–**	**45/–**	**49/–**	*d*
Each	**4/6**	**5/2**	**5/6**	

BRITISH STANDARDS

The British Standards Institution is the national standardising body of the U.K. The standards which it publishes represent the results of collaboration between a wide range of interests including users, technical and scientific experts and manufacturers.

The BSI maintains close contact with many overseas standardising bodies both by interchange of information and by direct representation through the medium of ISO (International Organisation for Standardisation). Many British Standards, particularly those revised in recent years reflect the influence of international requirements.

Any article made to a British Standard is one on which the purchaser or user can rely as being satisfactory for its intended general use. The BS requirements must be such as will satisfy the majority of users and manufacturers, otherwise the standard will not receive general recognition.

The discerning purchaser will not only require goods made to the appropriate BS but will also recognise that within the framework of a standard a variation of finish and quality is possible and that it is still as important as ever to purchase from a source with a known reputation for high quality.

The name *Gallenkamp* has been known in laboratories throughout the world for more than three quarters of a century. *Gallenkamp* products bearing one of the five registered trade marks, *Gallenkamp*, *Technico*, *Compenstat*, Ⓐ or *Asda* can be relied upon to provide the highest quality at an economic price.

Items on this page normally available from stock except those coded *N*.

PLASTICS BEAKERS

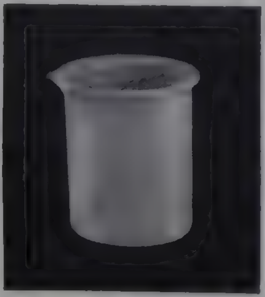
Properties of various plastics materials will be found under the heading PLASTICS—and will assist in selection of beakers for particular purposes.

BJ-835

BEAKERS, polypropylene, medium form, with spout.

Capacity	25	50	100	250 ml	
Dozen	**9/9**	**11/9**	**18/–**	**29/6**	c
Each	**2/6**	**2/8**	**3/1**	**4/–**	

Capacity	400	600	1000	2000 ml	
Dozen	**36/–**	**43/–**	**72/–**	**106/–**	c
Each	**4/6**	**5/–**	**7/2**	**9/9**	



BJ-835
BJ-836

BJ-836

BEAKERS, as BJ-835 but in a nesting set of eight, one of each size 25 to 2000 ml.

Dozen sets **£16. 0. 0.** Set **£1. 9. 0.** c

BJ-840

BJ-840

BEAKERS, expendable clear polystyrene, squat form, 20 ml. Useful for medical and radioisotope work. In packs of 100.

Dozen packs **£6.10. 0.** Pack **£0.11. 9.** c

***BJ-860**

BEAKERS, PTFE, squat form, inert to all chemicals except molten alkali metals and fluorine, and can thus replace platinum for many purposes. Suitable for use up to 300°C.

Capacity	50	100	150	250	500	1000 ml	
Each	**26/6**	**31/–**	**35/–**	**42/–**	**80/–**	**135/–**	m

BJ-860

METAL BEAKERS

BJ-910

BEAKERS, stainless steel, with spout.

Diameter	60	65	75	75	100 mm	
Height	75	115	125	165	165 mm	
Capacity (approx.)	200	350	550	700	1250 ml	
Each	**13/–**	**17/–**	**21/6**	**26/6**	**28/6**	m

BJ-910

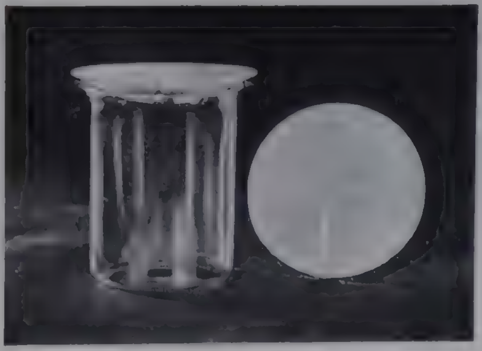
BEAKER COVERS

BJ-950

BEAKER COVERS, polythene, with radial ribs to raise cover from the beaker and allow evaporation.

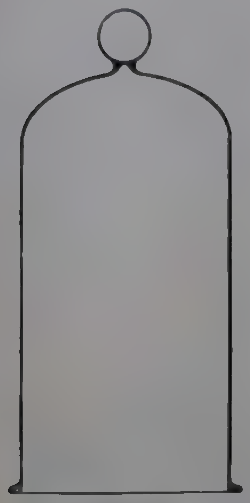
Diameter	95	108 mm	
Dozen	**45/–**	**46/–**	m
Each	**5/2**	**5/2**	

EJ-105 Beaker cover, polythene, with slot
WE-025 et. seq. Watch glasses for use as beaker covers ... ...
See entries in List No. sequence

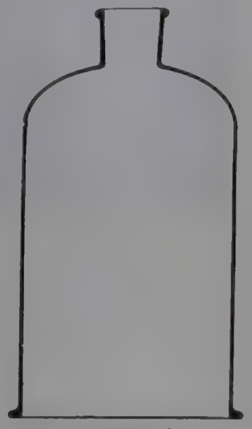


BJ-950

All items on this page normally available from stock.



BK-320



BK-331

BELL JARS

BK-320

BELL JARS, *Davisil* borosilicate glass, with knob and ground flange.

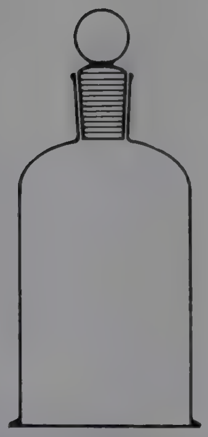
Height to shoulder	22·5	25	30 cm	
Dia. inside flange	12·5	15	20 cm	
Dozen	**292/–**	**351/6**	**594/–**	*d*
Each	**26/9**	**32/3**	**54/6**	

BK-331

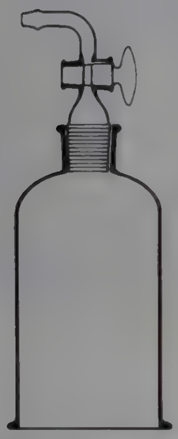
BELL JARS, *Davisil* borosilicate glass, with ground flange and 34/35 socket. **Without stopper or stopcock.**

Height to shoulder	22·5	25	30 cm	
Dia. inside flange	12·5	15	20 cm	
Dozen	**316/9**	**378/–**	**612/3**	*d*
Each	**29/–**	**34/8**	**56/1**	

For suitable rubber stopper see SU-760 et seq. size No. 30 in List No. sequence.



BK-331 with **BK-336**



BK-331 with **BK-342**

BK-336

BELL JAR STOPPER, borosilicate glass, with cone 34/35 ... ... Dozen **£3. 5. 0.** Each **£0. 6. 8.** *d*

BK-342

BELL JAR STOPCOCK, borosilicate glass, with cone 34/35. Dozen **£12. 8. 0.** Each **£1. 3. 0.** *d*

BK-345

BELL JAR BASES, plate glass frosted one side.

Size	20 × 20	25 × 25 cm	
For bell jar, dia.	12·5, 15	20 cm	
Dozen	**76/–**	**90/–**	c
Each	**7/6**	**8/6**	

BELLOWS

BK-620

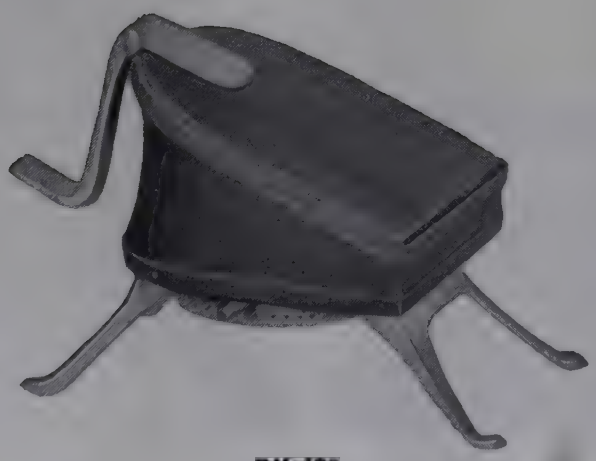
BELLOWS, foot, designed to give a steady air pressure and thus be suitable for glassblowing purposes. Overall dimensions, including step and air pipe, 38×30×18 cm.

Each **£9. 0. 0.** c

REPLACEMENT PARTS

BK-622	Rubber disks, 30 cm dia.	Each	**£0. 7. 6.**	c
BK-624	String nets, to limit expansion of rubber disks	Each	**£0. 6. 0.**	c

BENCHES and other laboratory furnishings, see **FURNITURE**



BK-620

All items on this page normally available from stock.

BENCHBLOWN AG GLASSWARE

Regd. Trade Mark

In this catalogue will be found a wide range of benchblown apparatus, almost all of which is manufactured in our works and marked accordingly with the AG monogram. A list of the principal headings which include AG benchblown apparatus is shown at the foot of this page.

STANDARDS OF DESIGN

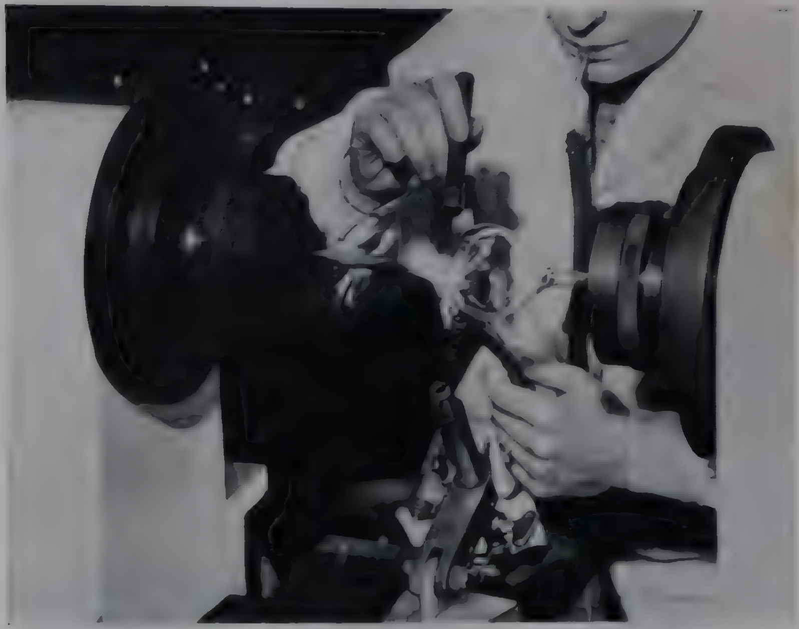
We have for many years been closely associated with the work of the British Standards Institution and the International Standards Organisation (ISO), and have collaborated in the preparation of many British Standards and ISO recommendations for numerous items of laboratory equipment. Such items will be found throughout the catalogue identified by the appropriate BS numbers. Some British Standards, in order to avoid undue restrictions and increased manufacturing costs, include permissible alternatives or guidance dimensions which are not a mandatory part of the specification. In such cases we have adopted the criteria of the highest possible quality at a competitive price, and involving the minimum of alteration to old-established designs in order to minimise possible inconvenience to customers. Many items of specialised apparatus are made to standards laid down by the Institute of Petroleum (IP), Standardization of Tar Products Tests Committee (STPTC) and the American Society for Testing Materials (ASTM).

METHODS OF PRODUCTION

During recent years we have continued to install new glassworking plant in our factories, and the production of many items formerly made by hand craftsmen is now largely mechanised. This development has made possible the inclusion of many detailed improvements in design which were not previously practicable by hand methods, and at the same time results in a greater uniformity of quality and dimensions of the finished product.

BOROSILICATE GLASS

All benchblown apparatus of our manufacture described in this catalogue as being made of BOROSILICATE GLASS is made from one of the well-known brands of glass having an expansion coefficient of $3{\cdot}2\times10^{-6}$ which for most purposes are equally suitable and interchangeable. Benchblown glassware requires mouldblown blanks in many different shapes, some of which are available from one glass manufacturer and some from another. We therefore use whichever glass is available to us in the forms most suitable for any given article.



ANNEALING

It is a well-known fact that it is not possible to construct glass apparatus from tubing and/or mouldblown blanks without introducing strain in the joints. Borosilicate glass has such a small coefficient of expansion that it will stand a considerable amount of strain before fracture, but this very fact frequently leads to the careless misuse of such apparatus in the belief that it will not break through thermal shock. The relief of strain introduced during manufacture is of vital importance to the user because apparatus which is free from strain will give longer service and will be free from the danger of breakage during reasonable usage. All apparatus of our manufacture is of adequate mechanical strength and fully annealed to glass manufacturers' schedules in accurately thermostatically controlled electric kilns.

For full details of AG benchblown glassware please refer to the following sections in this catalogue:—

Absorption bulbs and tubes
Carbon dioxide apparatus
Condensers
Crucibles, filter
Density determination
Distillation
Extraction
Fritted filtration apparatus
Funnels
Gas analysis
Mercury stills
Microchemical apparatus
Molecular weight determination
Nitrogen determination
Particle size determination
Petroleum products testing
Stopcocks
Viscometers
Washbottles
Weighing bottles and tubes

Order AG glassware and insist on receiving apparatus bearing our registered trade mark.

BIOLOGY

This section lists specialised apparatus for biological sciences. As most schools and colleges assemble their own apparatus for plant physiological experiments, we list only the special glass parts for such experiments.

Other more general apparatus used in biology but not listed in this section will be found either in alphabetical sequence or under particular headings as indicated in the following lists.

To be found in alphabetical sequence.

Bell jars
Calorimeters
Chromatography
Colorimeters
Culture
Dissecting
Electrophoresis
Freeze drying
Histology
Incubators
Microscopes
Microtomes
Refrigerators
Seed testing

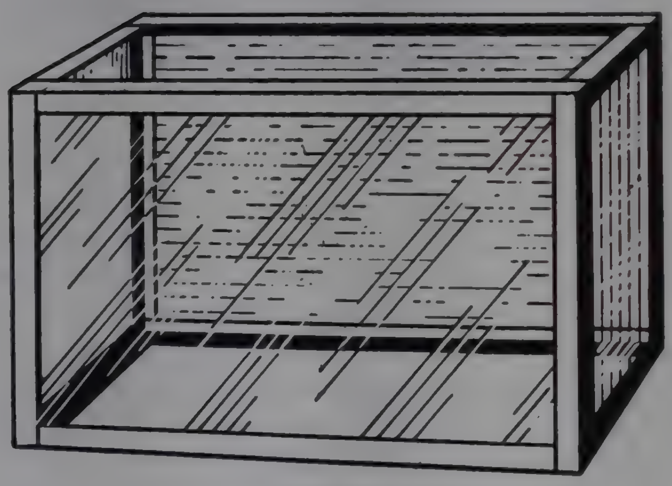
To be found under headings as indicated.

Anaerobic culture jars	see	Culture
Aerators	see	Air pumps
Cobalt chloride paper	see	Test papers
Cork borers for cutting leaf sections	see	Cork accessories
Cork slabs for mounting	see	Corks
Dewar vacuum flasks	see	Vacuum flasks
Dropping bottles	see	Bottles, dropping
Macerators	see	Mixers
Moisture tensiometer	see	Soil testing
Pneumatic troughs for osmosis experiments	see	Gas collecting
Porcelain tiles with cavities	see	Tiles
Slides and cover slips	see	Histology
Slide drying plate	see	Histology
Specimen tubes	see	Tubes, specimen
Thunberg tubes	see	Medical sciences
Whirling hygrometer	see	Hygrometers

BL-101

AQUARIA, angle iron frame, nylon coated. This finish, together with a resilient plastics cement securing the glass panels, provides aquaria which are very much less liable to rust and leakage than earlier patterns. Width 30 cm by 30 cm deep.

Length	60	90	120 cm	
Each	**108/–**	**152/–**	**185/–**	*m*



BL-101

TB-550 to TB-600

AQUARIA, glass, see entries in List No. sequence.

AF-380, AF-400

AERATORS, suitable for aquarium use, see entries in List No. sequence.

BL-110

DIFFUSER STONE, square, with long plastics tube stem for connection to aerator ... Each **£0. 2. 6.** *m*

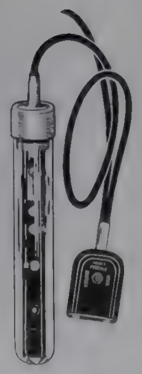
BL-120

AQUARIUM HEATER, insulated flexible loop heater, length 150 cm, with connecting cable and two pin plug, 100W for 220/240V supplies ... Each **£0. 19. 0.** *m*

BL-130

AQUARIUM THERMOSTAT, in glass tube for use in aquaria with BL-120 or other heaters. Controls to ±2°C. Supplied set for 25°C and adjustable between 18° and 30°C ... ... Each **£0. 19. 0.** *m*

BL-110



BL-130

BL-260

MOUNTING PINS, entomological, coloured black, 23 mm long ... ... Pack of 300 pins **£0. 3. 0.** *m*

All items on this page normally available from stock.

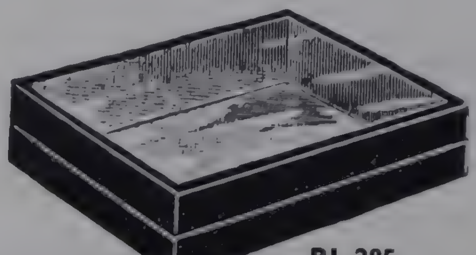
BT-820

BOXES, clear polystyrene, circular, suitable for use as entomological mounting boxes.

CV-050

CORK SHEET, suitable for cutting insert bases for above boxes, also for general specimen mounting purposes.

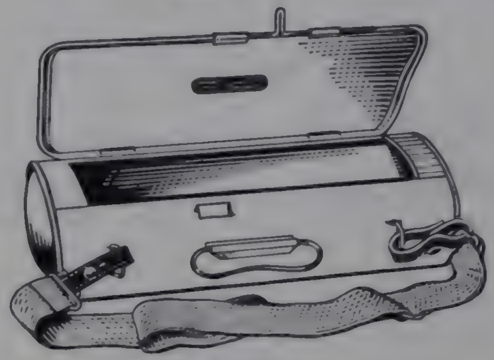
For full details of above items see entries in List No. sequence.


BL-285

BL-285

MOUNTING BOXES, rectangular stiff card, white inside, with glazed lid.

Length	6	9	13	18 cm	
Width	4·5	6	9	13 cm	
Depth	2·5	2·5	5	5 cm	
Dozen	**37/–**	**41/–**	**50/–**	**70/–**	*c*
Each	**4/6**	**4/10**	**5/6**	**7/–**	


BL-300

BL-300

VASCULA, enamelled aluminium, complete with webbing straps. Dimensions 32 × 16 × 6 cm.
Each **£2. 10. 0.** *m*

BL-320

PRESS, woven wire, galvanised finish, 45 × 30 cm fitted with webbing straps allowing for capacity up to approx. 10 cm thickness ... ... Each **£1. 18. 0.** *m*

BL-420

CLINOSTAT, electric, giving four revolutions per hour. Can be inclined at any angle from 0° to 90°. Supplied complete with cork disk, plastics cover and bottle holder, and suitable for 200/250V a.c. supplies only ... ... Each **£10. 5. 0.** *m*

BL-500

RESPIROMETER, Ganong, graduated and levelling tubes only ... ... Each **£3. 0. 0.** *a*

BL-520

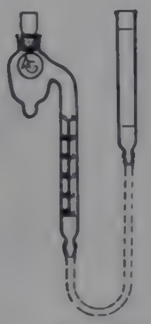
ABSORPTION TUBES, Pettenkoffer, for estimation of carbon dioxide produced in respiration.
Each **£0. 9. 3.** *a*

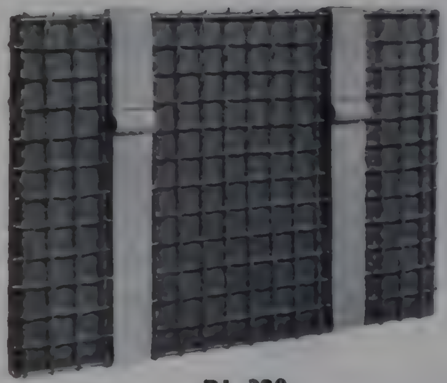
BL-610

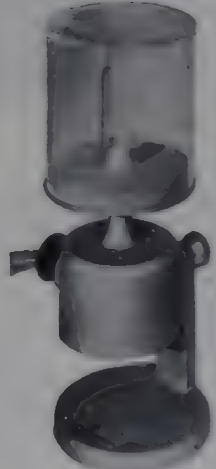
POTOMETER, Ganong, with 10/13 joint, for measuring transpiration rates, including funnel tube.
Each **£3. 6. 0.** *a*

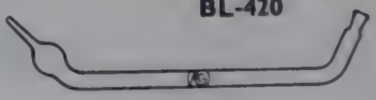
BL-650

TRANSPIRATION Y-TUBE, for experiments on transpiration ... ... Each **£0. 6. 0.** *a*


BL-500


BL-320


BL-420

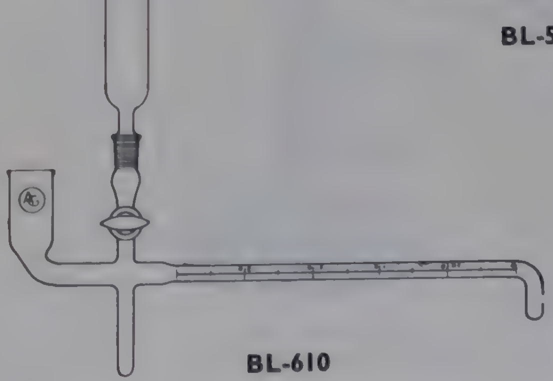

BL-520

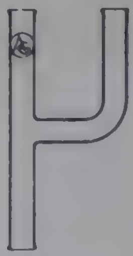
COPENHAGEN JARS see **SC-422**

FRITTED GLASS PLATES for seed testing and growing excised embryos see **FD-530**

MAGNIFIERS see **MA-660** et seq.

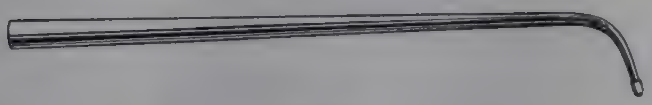
SEED TESTING PAPER see **FC-620**


BL-610


BL-650

Items on this page normally available from stock except those coded *N*.

BLACKBOARDS see FURNITURE
BLOOD TESTING see MEDICAL SCIENCES
BLOWBALLS see RUBBER SUNDRIES



BR-036

BR-036

BLOWPIPE, nickel plated brass, curved, length 20 cm.
Dozen **£1. 5. 0.** Each **£0. 3. 8.** *c*

BR-038

BLOWPIPE, as BR-036, but with bone mouthpiece.
Dozen **£1. 14. 0.** Each **£0. 4. 4.** *c*

BR-050

CHARCOAL BLOCKS, compressed, for blowpipe analysis. 50 × 30 × 30 mm.
Dozen **£0. 13. 0.** Each **£0. 2. 9.** *c*

BR-055

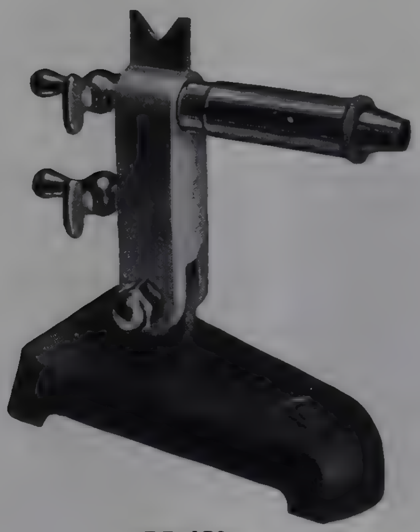
COBALT GLASS PLATES, for blowpipe analysis. Size 75 × 25 mm.
Dozen **£0. 9. 9.** Each **£0. 2. 6.** *c*

CX-560

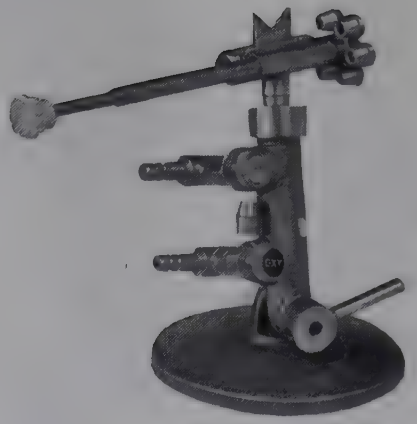
WIRE HOLDER, with collet chuck. For details see entry in List No. sequence.

Platinum wire and foil for blowpipe analysis, see Platinum.

Gallenkamp GLASSWORKING BLOWPIPES



BR-150
BR-160



BR-200
(BR-195 is similar)

SINGLE JET BLOWPIPES

BR-150

BLOWPIPE, *Gallenkamp,* **laboratory pattern.** A powerful burner with separate gas and air taps, capable of giving a very wide range of flames suitable for all laboratory glass blowing on soda-lime glass. Fitted with a V-notch for glass cutting and shaping. Supplied complete with three interchangeable jets, for use on coal gas.
Dozen **£48. 0. 0.** Each **£4. 6. 0.** *b*

BR-155

BLOWPIPE, *Gallenkamp,* as BR-150 but with additional oxygen boost tap for working borosilicate glass.
Dozen **£60. 0. 0.** Each **£5. 8. 0.** *b*

BR-160

BLOWPIPE, *Gallenkamp,* as BR-150 but designed for use with bottled gases. With one jet suitable for use with butane at 11 in W.G. pressure and propane at 13 to 14 in W.G. pressure.
Dozen **£66. 0. 0.** Each **£6. 0. 0.** *b*

MULTI-JET BLOWPIPES

BR-195

BLOWPIPE, *Gallenkamp,* **multi-jet quiet pattern.** (Patent No. 806574). This blowpipe provides a complete range of temperatures and flame sizes for all glassblowing work on soda and borosilicate glass **without the objectionable roar usually associated with oxygen flames.** The five jets on the rotating turret head are instantly interchangeable without the flame being extinguished, and provide a range of flame sizes suitable for working glass tubing from the smallest up to 60 mm dia. The gas mixture can be accurately controlled by means of large gas and air stopcocks and a fine adjustment oxygen valve. A V notch is provided for glass cutting and shaping. For use with town gas which, for the largest flame sizes, should be pressurised to 6 lb/in^2 (0·4 kg/cm^2) Each **£21. 0. 0.** *b*

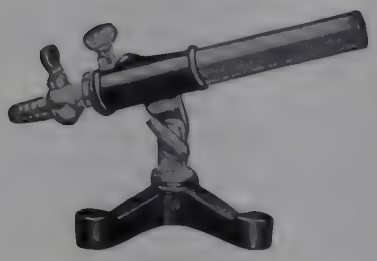
BR-200

BLOWPIPE, *Gallenkamp,* **multi-jet, quiet pattern** as BR-195 but for use with propane or butane gas with oxygen. This model is fitted with two fine adjustment valves and interchangeable jets ... Each **£21. 10. 0.** *b*

Gas cylinder fittings, control valves, etc. for oxygen or LPG cylinders for use with any of above blowpipes, see GAS CYLINDERS.

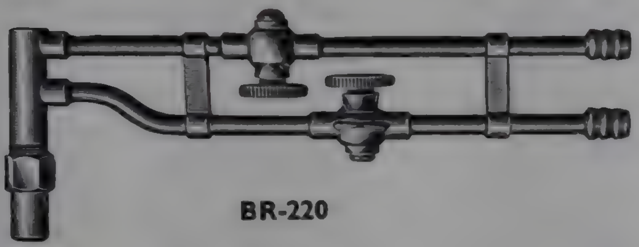
All items on this page normally available from stock.

BLOWPIPES
(continued)


BR-210

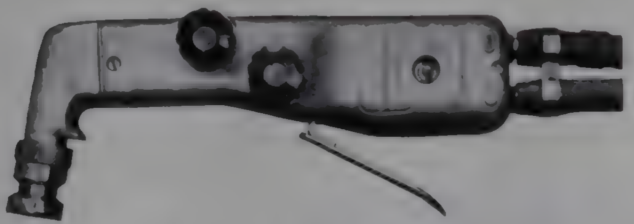
BR-210

BLOWPIPE, bench model, for petrol-air gas, with separate air and gas taps capable of providing a wide range of flames. With an adjustable pivot and heavy metal stand. Each **£8. 12. 6.** *m*


BR-220

BR-220

BLOWPIPE, Bornkessel, hand type, with independent gas and air regulating taps giving fine flame control. Each **£3. 10. 0.** *f*


BR-240 with BR-245

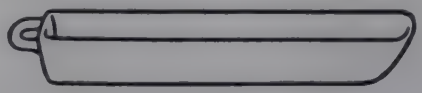
BR-240

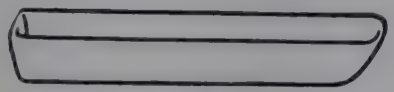
BLOWPIPE, *Flamemaster,* hand torch, complete with Flexiflame unit and nozzle cap. Suitable for burning coal gas with air (or air/oxygen mixture when using BR-242) and capable of giving a large brush or small needle flame. With economiser trigger which cuts air and gas down to a pilot flame when the operator's grip is relaxed. Rapid action needle valve controls ... Each **£9. 12. 0.** *m*

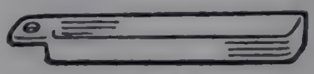
REPLACEMENTS AND ACCESSORIES

BR-242	**Oxygen air mixer,** for use with BR-240, for working hard glass	Each **£4. 15. 0.**	
BR-244	**Spare Flexiflame unit,** for BR-240, with stainless steel multi-hole air jet	Each **£1. 0. 0.**	*f*
BR-245	**Maxiflame unit,** to replace Flexiflame unit in BR-240 for burning butane, coal gas or natural gas with compressed air. Consists of jet and nozzle assembly which is capable of producing a hot fierce flame suitable for brazing	Each **£2. 4. 0.**	*f*
BR-246	**Oxyflame units, set of three,** to replace Flexiflame unit in BR-240, for burning utane, coal gas or hydrogen with oxygen only. Capable of giving three sizes of very hot flame	Set **£2. 17. 0.**	*f*
BR-248	**Spare nozzle cap,** to be used in conjunction with Flexiflame or Oxyflame units ...	Each **£0. 13. 0.**	*f*
BR-250	**Soldering bolt attachment,** converts torch into soldering iron with precise temperature control for light soldering	Each **£2. 19. 0.**	*f*
BR-252	**Bench clamp,** converts BR-240 into useful bench blowpipe	Each **£2. 3. 0.**	*f*
BR-254	**Tubing,** twin bore, with clip, in 10 ft lengths.	Each **£1. 0. 0.**	*f*

BOATS


BR-620
BR-640
BR-700


BR-681


BR-730

BR-620

BOATS, combustion, *Royal Worcester* porcelain, glazed, with handle.

No.	2	3	4	7	
Length	60	70	75	100 mm	
Width	10	6	11	18 mm	
Height	6	6	6	12 mm	
Dozen	**22/–**	**26/–**	**31/–**	**57/–**	d
Three	**6/6**	**7/6**	**8/6**	**15/–**	
Each	**3/5**	**3/8**	**4/1**	**6/–**	

BR-640

BOATS, combustion, *Vitreosil* translucent silica, glazed, with handle.

No.	1	2	3	4	
Length	50	80	80	100 mm	
Width	15	18	20	20 mm	
Height	10	10	13	12 mm	
Pack of 10	**88/–**	**112/–**	**130/–**	**156/–**	m
Each	**9/7**	**12/7**	**14/5**	**17/3**	

BR-681

BOATS, combustion, highly refractory material, specially made for analysis of carbon and sulphur in steel. Batch tested for carbon and sulphur blanks.

Length	73	91	98 mm	
Width	15	18	17 mm	
Height	13	14	12 mm	
100	**33/–**	**33/–**	**33/–**	c
10	**4/9**	**4/9**	**4/9**	

BR-700

BOAT, combustion, unglazed, with handles suitable for use with Strohlein apparatus, 75 mm long, 12 mm wide, 9 mm high. Gross **£2. 1. 0.** Dozen **£0. 4. 10.** c

BR-730

BOATS, micro combustion, *Royal Worcester* porcelain, glazed, with handle, made to BS 1428, Part 11.

No.	1	2	3	
Length excluding handle	14	26	46 mm	
Length overall	21	34	55 mm	
Depth	3	4	5 mm	
Dozen	**22/–**	**24/–**	**29/–**	d
Three	**6/6**	**7/–**	**8/–**	
Each	**3/5**	**3/7**	**3/11**	

All items on this page normally available from stock.

BOTTLES

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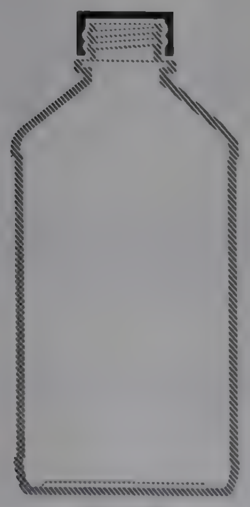
BOTTLE CAPACITIES

All bottle capacities listed in this catalogue are to be understood as nominal capacities.

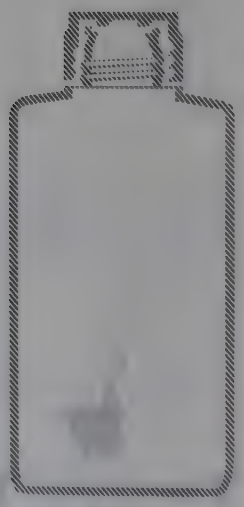
In view of the general use of metric units in laboratories, all capacities are listed in a conventional metric series. Bottles manufactured to nominal capacities in other units have been converted to metric in accordance with the following table.

Manufacturers nominal capacity quoted in			Metric equivalent	
oz	lb	gal	Calculated ml	Listed nominal ml
½			14	15
1			28	30
2			57	60
4			114	125
6			171	175
8			227	250
12			341	350
16	1		454	500
			litres	litres
32	2		0·91	1
64	4		1·82	2
80		½	2·27	2
90			2·56	2·5
160		1	4·55	4·5
		2	9·09	9
		5	22·73	22

GENERAL PURPOSE BOTTLES



BT-100



BT-105

NARROW NECK, PLASTICS

(Properties of plastics materials—see page 624.)

BT-100

BOTTLES, polythene, narrow neck, fitted with black urea screw cap and vinyl faced liner.

Capacity	60	125	250	500 ml	
Thread R4/	20	20	20	28	
Gross	**96/–**	**140/–**	**175/–**	**290/–**	c
Dozen	**9/–**	**12/9**	**16/–**	**26/6**	

Capacity	1000	2000	4500 ml	
Thread	R3/33	R4/31	R4/31	
Gross	**380/–**	**580/–**	**860/–**	c
Dozen	**35/–**	**52/–**	**78/–**	
Each	**4/5**	**5/8**	**7/8**	

BT-350 **Screw caps, spare for above bottles, see entry in List No. sequence.**

BT-105

BOTTLES, polypropylene, narrow neck fitted with polypropylene screw cap. Can be sterilised in an autoclave up to 135°C.

Capacity	30	60	125	250	500	1000 ml	
Dozen packs	**118/–**	**118/–**	**129/–**	**247/–**	**376/–**	**774/–**	m
Pack of 12	**12/8**	**12/8**	**13/6**	**27/–**	**39/6**	**81/–**	
Each	**2/9**	**2/9**	**2/9**	**3/9**	**4/9**	**7/10**	

All items on this page normally available from stock.

GENERAL PURPOSE BOTTLES

NARROW NECK, GLASS

BT-130

BOTTLES, unstoppered, narrow neck, clear white glass. The cork sizes quoted are the size Nos. of suitable corks CV-010 for convenience in ordering if corks are required.

Capacity	30	60	125	250	500	1000 ml	
Cork size	6	6	8	10	10	13	
Std. pack qty.	36	36	36	24	24	24	
Gross	**81/–**	**108/–**	**126/6**	**144/3**	**220/–**	**408/–**	*m*
Std. pack	**20/–**	**29/–**	**33/–**	**26/–**	**40/–**	**86/–**	
Dozen	**7/6**	**10/–**	**11/6**	**13/3**	**20/3**	**44/–**	
Each	—	**2/6**	**2/7**	**2/9**	**3/3**	**5/–**	

BT-132

BOTTLES, as BT-130 but in *Davisil* borosilicate glass and including larger sizes.

Capacity	0·25	0·5	1	2	5	10 litre	
Cork size	10	10	13	15	19	—	
Dozen	**70/–**	**84/–**	**114/–**	**170/–**	**290/–**	**460/–**	*m*
Each	**7/–**	**8/–**	**10/3**	**15/6**	**26/6**	**42/–**	

BOTTLES, plastics-stoppered reagent, narrow neck ground interchangeably and fitted with hexagonal head dustproof red polypropylene stoppers.

Capacity	30	60	125	250	500	1000 ml
Neck joint	16/16	16/16	19/22	24/29	24/29	29/32
Std. pack qty.	36	36	36	24	24	12

BT-140 in clear white glass

Gross	**260/–**	**270/–**	**320/–**	**340/–**	**410/–**	**680/–**	*m*
Std. pack	**69/–**	**72/–**	**84/–**	**60/–**	**74/–**	**62/–**	
Dozen	**24/–**	**24/6**	**29/6**	**31/–**	**37/–**	—	
Each	**3/7**	**3/7**	**4/–**	**4/1**	**4/6**	**6/4**	

BT-142 in amber glass

Gross	**310/–**	**320/–**	**370/–**	**450/–**	**510/–**	**780/–**	*m*
Std. pack	**82/–**	**84/–**	**98/–**	**80/–**	**90/–**	**72/–**	
Dozen	**28/6**	**29/6**	**34/–**	**41/–**	**46/–**	—	
Each	**3/11**	**4/–**	**4/4**	**4/10**	**5/2**	**7/2**	

SU-710
SU-712 } **STOPPERS, polypropylene,** interchangeable, in several colours suitable for colour coding above bottles. For prices see entries in List No. sequence.

BOTTLES, glass-stoppered reagent, narrow neck with individually ground and fitted dustproof glass stoppers.

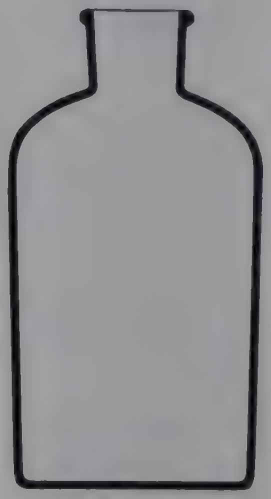
Capacity	30	60	125	250	500	1000 ml
Std. pack qty.	36	36	36	24	24	24

BT-150 in clear white glass

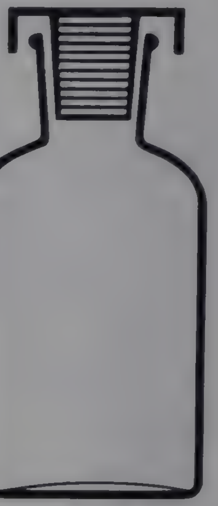
Gross	**212/–**	**239/–**	**259/–**	**278/–**	**406/–**	**605/–**	*m*
Std. pack	**56/–**	**64/–**	**68/–**	**50/–**	**74/–**	**108/–**	
Dozen	**19/6**	**21/9**	**23/9**	**25/6**	**37/3**	**55/6**	
Each	**3/3**	**3/5**	**3/7**	**3/8**	**4/6**	**6/–**	

BT-152 in amber glass

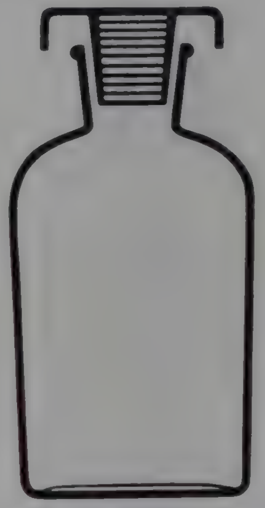
Gross	**242/–**	**255/–**	**275/–**	**320/–**	**450/–**	**665/–**	*m*
Std. pack	**64/–**	**68/–**	**72/–**	**57/–**	**80/–**	**118/–**	
Dozen	**22/–**	**23/6**	**25/–**	**29/6**	**41/–**	**62/–**	
Each	**3/5**	**3/6**	**3/8**	**4/–**	**4/10**	**6/4**	



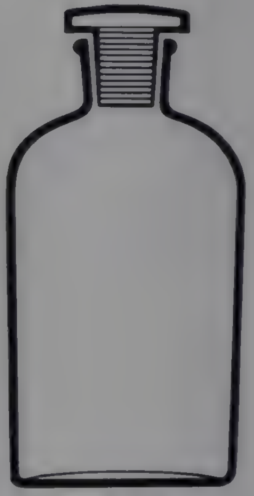
BT-130
BT-132



BT-140
BT-142



BT-150
BT-152



BT-160
BT-165

BT-160

BOTTLES, stoppered, *Davisil* borosilicate glass, narrow neck with ground glass stoppers.

Capacity	0·25	0·5	1	2	5	10 litre	
Dozen	**84/–**	**104/–**	**140/–**	**196/6**	**365/9**	**586/–**	*m*
Each	**8/–**	**9/6**	**12/9**	**18/–**	**33/6**	**53/9**	

BT-165

BOTTLES, stoppered reagent, *Pyrex brand* glass, narrow neck with interchangeable ground glass stopper.

Capacity	60	100	250	500	1000 ml	
Neck size	19/17	19/17	24/29	24/29	40/38	
Std. pack qty.	24	24	36	24	24	
Std. pack	**389/–**	**396/–**	**621/–**	**448/–**	**522/–**	d
Dozen	**200/–**	**205/–**	**215/–**	**230/–**	**270/–**	
Each	**18/–**	**18/6**	**19/6**	**21/–**	**24/6**	

Capacity	2	5	10	20 litre	
Neck size	40/38	50/42	60/46	60/46	
Std. pack qty.	6	2	1	1	
Std. pack	**164/–**	**90/–**	**73/6**	**137/3**	d
Each	**30/5**	**50/–**	—	—	

For reservoir bottles with standard joint neck see BW-655 in List No. sequence.

All items on this page normally available from stock.

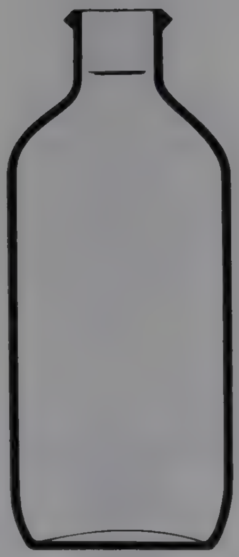
GENERAL PURPOSE BOTTLES

NARROW NECK, GLASS
(continued)

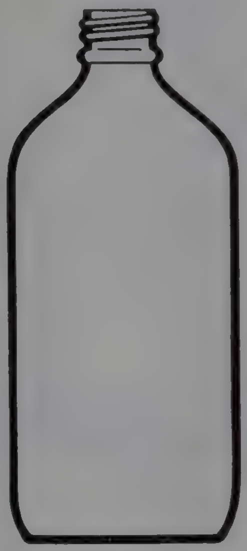
BT-170

BOTTLES, unstoppered, Winchester shape, narrow neck, clear white glass. The cork sizes quoted are the size Nos. of suitable corks CV-010 for convenience in ordering if corks are required.

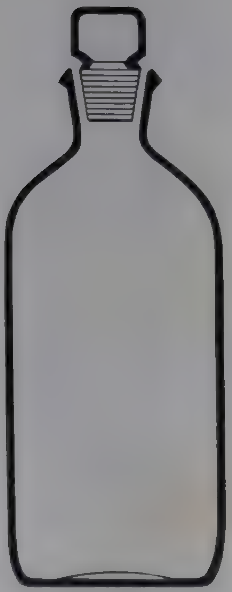
Capacity	125	250	500	1000	2500 ml	
Cork size	6	7	9	9	10	
Std. pack qty.	72	72	24	12	12	
Gross	**66/–**	**78/–**	**106/–**	**185/–**	**380/–**	c
Std. pack	**34/–**	**40/–**	**19/–**	**17/–**	**35/–**	
Dozen	**6/8**	**7/8**	**9/9**	—	—	



BT-170



BT-172
BT-174



BT-180

BT-190

BOTTLES, screw neck, Winchester shape. The necks of these bottles have moulded screw threads to BS 1918 and a choice of caps in various materials is listed below. **Supplied without caps.**

BT-172 in clear white glass.

BT-174 in amber glass.

Capacity	30	60	125	250 ml	
Screw thread R3/	20	22	24	24	
Std. pack qty.	144	144	72	72	
Std. pack	**42/–**	**45/–**	**33/–**	**39/–**	c
Dozen	**4/11**	**5/2**	**6/8**	**7/6**	

Capacity	500	1000	2500 ml	
Screw thread	R3/28	R4/31	R4/31	
Std. pack qty.	24	12	12	
Gross	**106/–**	**185/–**	**380/–**	c
Std. pack	**19/–**	**17/–**	**35/–**	
Dozen	**9/9**	—	—	

SCREW CAPS, suitable for above bottles.

For bottles 30 to 500 ml with R3/ threads.

BT-330	**Enamelled metal**	For prices and details see entries in List No. sequence.
BT-335	**Aluminium**	
BT-340	**Black bakelite**	
BT-345	**White urea**	

For bottles 1000 and 2500 ml with R4/ threads.

BT-350	**Black urea**	For prices and details see entries in List No. sequence.
BT-355	**Black urea**	
BT-358	**Polypropylene**	

BT-180

BOTTLES, glass stoppered, Winchester shape, with individually ground and fitted peg stoppers, clear white glass.

Capacity	125	250	500	1000	2500 ml	
Std. pack qty.	72	72	24	12	12	
Gross	—	—	**290/–**	**370/–**	**590/–**	c
Std. pack	**118/–**	**135/–**	**52/–**	**34/–**	**53/–**	
Dozen	**21/–**	**24/–**	**26/6**	—	—	

BT-190

BOTTLES, screw neck, medical flat pattern, clear white glass. The necks of these bottles have moulded screw threads to BS 1918 and a choice of caps in various materials is listed below. **Supplied without caps.**

Capacity	60	125	250	500 ml	
Screw thread R3/	20	22	24	28	
Std. pack qty.	144	144	72	36	
Std. pack	**43/–**	**51/–**	**32/–**	**27/–**	c
Dozen	**5/–**	**5/8**	**6/4**	**9/6**	

SCREW CAPS, suitable for above bottles.

BT-330	**Enamelled metal**	For prices and details see entries in List No. sequence.
BT-335	**Aluminium**	
BT-340	**Black bakelite**	
BT-345	**White urea**	

All items on this page normally available from stock.

GENERAL PURPOSE BOTTLES

WIDE NECK, PLASTICS

(Properties of plastics materials—see page 624.)

BT-205

BOTTLES, polythene, semi-wide neck, suitable for storage of oil samples, reagents or standard solutions. These robust bottles are fitted with polythene screw caps with independent deep seating inner stopper and are thus exceptionally secure against all hazards.

Capacity	250	500	1000 ml	
Dozen	**32/–**	**35/–**	**53/–**	c
Each	**4/2**	**4/5**	**5/8**	

BT-210

BOTTLES, polythene, wide neck, fitted with black bakelite screw cap.

Capacity	60	125	250	500 ml	
Thread R3/	33	43	56	56	
Gross	**130/–**	**145/–**	**215/–**	**310/–**	c
Dozen	**11/9**	**13/3**	**19/6**	**28/–**	

BT-340 **Screw caps,** spare for BT-210, see entry in List No. sequence.

BT-215

BOTTLES, polypropylene, wide neck, fitted with polypropylene screw cap. Can be sterilised in an autoclave up to 135°C.

Capacity	60	125	250	500	1000 ml	
Dozen packs	**140/–**	**177/6**	**494/6**	**634/–**	**860/–**	*m*
Pack of 12	**14/9**	**18/9**	**52/–**	**66/–**	**89/–**	
Each	**2/9**	**3/2**	**5/8**	**6/9**	**8/6**	

BT-220

BOTTLES, polythene, extra wide neck, fitted with black bakelite screw cap with liner.

Capacity	125	250	500	1000 ml	
Screw thread R3/	56	70	100	100	
Gross	**165/–**	**210/–**	**450/–**	**550/–**	c
Dozen	**15/–**	**19/–**	**41/–**	**50/–**	
Each	—	—	**4/10**	**5/6**	

BT-340 **Screw caps,** spare for BT-220, see entry in List No. sequence.

BT-225

BOTTLES, rigid polythene, extra wide neck, square shape, fitted with rigid polythene screw cap.

Capacity	500	1000	2000 ml	
Std. pack qty.	60	46	36	
Std. pack	**200/–**	**180/–**	**175/–**	c
Dozen	**43/–**	**50/–**	**60/–**	
Each	**4/11**	**5/6**	**6/4**	

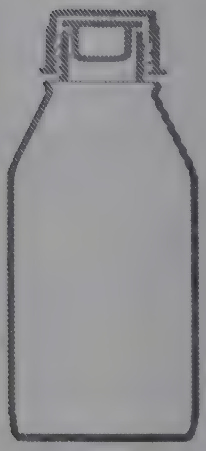
WIDE NECK, GLASS

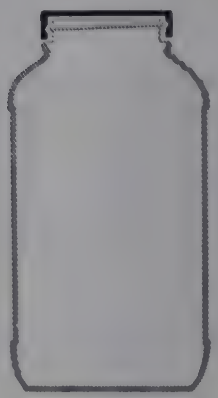
BT-245

BOTTLES, unstoppered, wide neck, clear white glass. Capacities 2 and 5 litre in *Davisil* borosilicate glass.

Capacity	30	60	125	250	500 ml	
Std. pack qty.	36	36	36	24	24	
Gross	**91/6**	**108/–**	**165/–**	**216/–**	**312/–**	*m*
Std. pack	**23/6**	**28/–**	**43/–**	**39/–**	**56/–**	
Dozen	**8/6**	**9/9**	**14/9**	**19/9**	**28/6**	

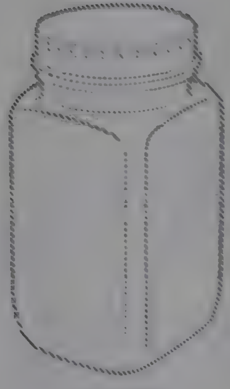
Capacity	1	2	5 litre	
Dozen	**56/3**	**168/6**	**277/6**	*m*
Each	**6/–**	**15/6**	**25/6**	

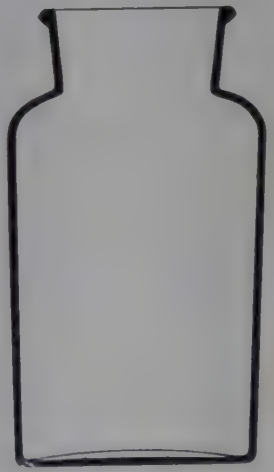

BT-205


BT-210

BT-215

BT-220


BT-225


BT-245

All items on this page normally available from stock.

GENERAL PURPOSE BOTTLES

WIDE NECK, GLASS
(continued)

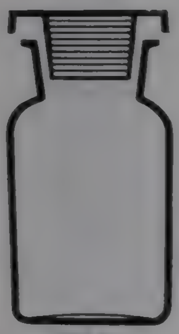
BOTTLES, glass-stoppered reagent, wide neck with individually ground and fitted dustproof glass stoppers.

BT-250 in clear white glass.

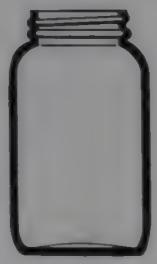
Capacity	250	500	1000 ml	
Std. pack qty.	36	36	12	
Gross	400/-	590/-	840/-	c
Std. pack	106/-	155/-	76/-	
Dozen	37/-	54/-	—	
Each	4/6	5/10	7/6	

BT-252 in amber glass.

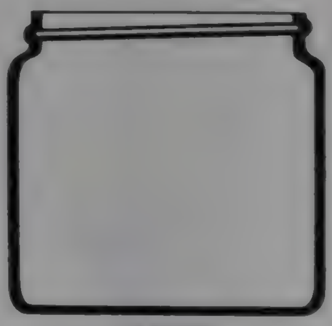
Capacity	250	500	1000 ml	
Std. pack qty.	36	36	12	
Gross	400/-	590/-	840/-	c
Std. pack	106/-	155/-	76/-	
Dozen	37/-	54/-	—	
Each	4/6	5/10	7/6	



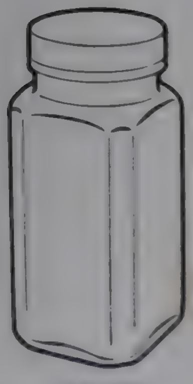
BT-250
BT-252



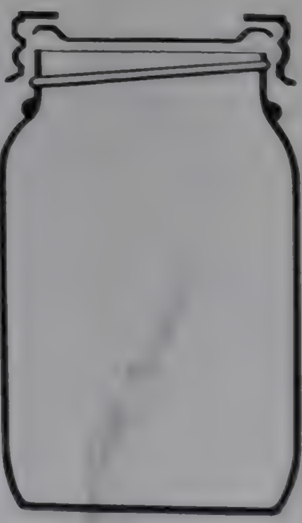
BT-260



BT-265



BT-280



BT-290

BT-260

BOTTLES, wide screw neck, clear white glass. The necks of these bottles have moulded screw threads to BS 1918 and a choice of metal or plastics caps is listed below. **Supplied without caps.**

Capacity	15	30	60	125	175 ml	
Screw thread R3/	28	33	38	38	48	
Std. pack qty.	144	144	144	72	72	
Std. pack	37/-	43/-	46/-	34/-	38/-	c
Dozen	4/6	5/-	5/2	4/4	4/7	

Capacity	250	350	500	1000 ml	
Screw thread R3/	48	51	51	63	
Std. pack qty.	72	24	24	24	
Gross	—	98/-	108/-	185/-	c
Std. pack	40/-	17/6	19/-	33/-	
Dozen	4/9	9/-	10/-	17/-	

SCREW CAPS, suitable for above bottles.

BT-330	**Enamelled metal**	For prices and details see entries in List No. sequence.
BT-340	**Black bakelite**	

BT-265

BOTTLES, extra-wide screw neck, clear white glass. The necks of these bottles have moulded screw threads to BS 1918 and a choice of metal or plastics caps is listed below. **Supplied without caps.**

Capacity	15	30	60	125	250 ml	
Screw thread R3/	38	38	51	56	89	
Std. pack qty.	144	144	72	72	48	
Std. pack	35/-	40/-	23/6	29/6	32/-	c
Dozen	4/5	4/9	3/6	4/-	8/9	

SCREW CAPS, suitable for above bottles.

BT-330	**Enamelled metal**	For prices and details see entries in List No sequence.
BT-340	**Black bakelite**	

BT-280

BOTTLES, extra-wide screw neck, square shape, clear white glass, with plastics screw caps.

Capacity	500	1000	2000 ml	
Dozen	26/-	36/-	52/-	c
Each	3/8	4/6	5/8	

BT-290

BOTTLES, Kilner, wide neck with expendable coated cap and screw sealing ring.

Capacity	500	1000	2000 ml	
Std. pack qty.	12	12	6	
Doz. packs	240/-	290/-	220/-	c
Std. pack	22/-	26/6	20/-	

BT-292 **Caps,** coated metal, spare for above. In pack of 25.
Dozen packs £6. 0. 0. Pack £0. 11. 0. c

All items on this page normally available from stock.

BOTTLE CAPS

A range of metal and plastics screw caps suitable for use on bottles with screw thread necks to BS 1918. All caps are supplied in packs of one dozen.

R3 THREADS

BT-330

BOTTLE CAPS, plated and enamelled metal with pulpboard liner, suitable for glass bottles of sizes indicated.

Thread R3		20	22	24	28	33	38 mm	
BT-172 BT-174	size	30	60	125 250	500	—	— ml	
BT-190	,,	60	125	250	500	—	— ml	
BT-260	,,	—	—	—	15	30	60 125 ml	
BT-265	,,	—	—	—	—	—	15 30 ml	
Dozen packs		**7/6**	**7/6**	**7/6**	**7/6**	**10/6**	**11/9**	c
Pack of 12		**2/6**	**2/6**	**2/6**	**2/6**	**2/7**	**2/8**	

Thread R3		48	51	56	63	89	mm	
BT-260	size	175 250	350 500	—	1000	—	ml	
BT-265	,,	—	60	125	—	250	ml	
Dozen packs		**15/–**	**15/6**	**18/–**	**22/6**	**44/–**		c
Pack of 12		**2/11**	**2/11**	**3/1**	**3/5**	**5/–**		

BT-335

BOTTLE CAPS, aluminium, with black rubber liner, sterilizable.

Thread R3		20	22	24	28 mm	
BT-172 BT-174	size	30	60	125 250	500 ml	
BT-190	,,	60	125	250	500 ml	
Dozen packs		**20/–**	**21/6**	**23/6**	**26/6**	c
Pack of 12		**3/3**	**3/4**	**3/6**	**3/9**	

BT-340

BOTTLE CAPS, black bakelite, with liner.

Thread R3		20	22	24	28	33 mm	
BT-172 BT-174	size	30	60	125 250	500	— ml	
BT-190	,,	60	125	250	500	— ml	
BT-210	,,	—	—	—	—	30 ml	
BT-260	,,	—	—	—	15	30 ml	
Dozen packs		**8/3**	**8/9**	**9/6**	**12/–**	**16/–**	c
Pack of 12		**2/6**	**2/6**	**2/6**	**2/8**	**2/11**	

Thread R3		38	43	48	51	56 mm	
BT-210	size	—	125	—	—	250 500 ml	
BT-220	,,	—	—	—	—	125 ml	
BT-260	,,	60 125	—	175 250	350 500	— ml	
BT-265	,,	15 30	—	—	60	125 ml	
Dozen packs		**20/–**	**23/–**	**25/6**	**33/–**	**37/–**	c
Pack of 12		**3/3**	**3/6**	**3/8**	**4/3**	**4/6**	

Thread R3		63	70	89	100 mm	
BT-220	size	—	250	—	500 1000 ml	
BT-260	,,	1000	—	—	— ml	
BT-265	,,	—	—	250	— ml	
Dozen packs		**40/–**	**76/–**	**82/–**	**140/–**	c
Pack of 12		**4/9**	**7/6**	**7/10**	**12/9**	
Each		**—**	**2/6**	**2/6**	**2/8**	

BT-345

BOTTLE CAPS, white urea with conical polythene sealing insert.

Thread R3		20	22	24	28 mm	
BT-172 BT-174	size	30	60	125 250	500 ml	
BT-190	,,	60	125	250	500 ml	
Dozen packs		**14/6**	**15/–**	**16/–**	**18/6**	c
Pack of 12		**2/10**	**2/11**	**2/11**	**3/2**	

BT-574

BOTTLE CAP, spraying, with R3/24 neck thread.

BT-576

BOTTLE CAP, dispensing, with R3/24 neck thread.

For full details and prices of above see entries in List No. sequence.

R4 THREADS

BT-350

BOTTLE CAPS, black urea with vinyl faced liner.

Thread R4		20	28	31 mm	
BT-100	size	60 125 250	500	2000 4500 ml	
BT-172 BT-174	,,	—	—	1000 2500 ml	
Dozen packs		**15/6**	**15/6**	**15/6**	c
Pack of 12		**2/11**	**2/11**	**2/11**	

BT-355

BOTTLE CAPS, black urea with conical polythene sealing insert. Thread R4/31 to fit glass bottles BT-172 and BT-174 sizes 1 and 2·5 litre.

Dozen Packs	**£1. 4. 6.**	c
Pack of 12	**£0. 3. 7.**	

BT-358

BOTTLE CAPS, polypropylene, sterilizable. Thread R4/31 to fit polythene bottles BT-100 sizes 1, 2 and 4 litre and glass bottles BT-172 and BT-174 sizes 1 and 2·5 litre.

Dozen Packs	**£5. 2. 0.**	c
Pack of 12	**£0. 9. 6.**	

BS 572 CONE JOINT PLASTIC STOPPERS

Interchangeable plastics stoppers suitable for use with bottles BT-140, BT-142, BT-400, BT-402, etc.

SU-710

STOPPERS, (AG), **polypropylene,** to BS 572. With dustproof hexagonal head and closed lower end. Coloured red with grey disk insert. Sizes 19/22, 24/29 and 29/32.

SU-712

STOPPERS, (AG), **polypropylene** as SU-710 but in other colours suitable for colour coding. Available in white, yellow, green or blue all with grey disk insert.

For full details and prices of above see entries in List No. sequence.

All items on this page normally available from stock.

Gallenkamp LABELLED REAGENT BOTTLES

LABELS

All reagent bottles listed in this section are processed in our own factory. Two types of label are available:—

Enamel Labels are silk screen printed using vitreous enamels of the highest available chemical resistance. The legend and border are well defined in black enamel on a dense white tablet. Firing at a high temperature fuses the enamel to the surface of the glass.

Sandblast Labels. Clear glass letters and border stand out from the deeply sandblast background and remain fully legible even when wet.

STOPPERS

Most narrow neck reagent bottles are fitted with interchangeable, dustproof, hexagonal grip polypropylene stoppers (joint sizes as shown for bottles BT-140). The remaining narrow neck bottles with titles of reagents for which polypropylene is unsuitable, also all wide neck bottles have individually ground and fitted dustproof glass stoppers. The stoppers of indicator bottles are of polythene and have integral teat droppers.

AVAILABLE TITLES

Any title can be inscribed on any suitable size of bottle but it is not practicable to stock all the possible combinations.

Labelled bottles are listed in three ranges.

1. Bottle size and title combinations which are in heavy demand and are normally available from stock.
2. Bottle size and title combinations in smaller but regular demand, which are made to order.
3. Bottles with titles to customers' special order.

BLANK LABEL BOTTLES

A range of bottles in several sizes having white vitreous enamel writing tablets with black borders is included. These are intended for user inscription by means of wax pencil, paint, felt tip marker, etc.

LABELLED BOTTLES, STOCK RANGE

This range comprises narrow neck labelled bottles in combinations of title, bottle type and size which are in heavy demand. They are normally available from warehouse stock with vitreous enamel or (except indicators and blank labels) sandblast labels. Indicator and blank label bottles are supplied only with enamel labels.

TITLES, TITLE NUMBERS AND BOTTLE DESCRIPTIONS

250 ml REAGENT, narrow neck, enamel or sandblast label		
200		Acetic acid, dil.
202		,, ,, , glacial
204		Acetone
206		Ammonium acetate
208		,, carbonate
210		,, chloride
212		,, hydroxide, conc.
214		,, ,, , dil.
216		,, molybdate
218		,, oxalate
220	A	,, sulphide
222		Barium chloride
224	G	Benzene
226	G	Bromine water
228		Calcium chloride
230	GA	Carbon tetrachloride
232	GA	Chloroform
234	GA	Ether
236		Ethyl alcohol
238		Fehling's solution No. 1
240		,, ,, No. 2
242		Ferric chloride
244	G	Hydrochloric acid, conc.
246		Hydrochloric acid, dil.
248		Lead acetate
250		Lime water
252		Mercuric chloride
254		Methyl alcohol
256	GA	Nitric acid, conc.
258		,, ,, , dil.
260		Potassium chromate
262		,, dichromate
264		,, ferricyanide
266		,, ferrocyanide
268		,, hydroxide
270		,, iodide
272		,, permanganate
274		,, thiocyanate
276	A	Silver nitrate
278		Sodium carbonate
280		,, hydroxide
282		,, phosphate
284		Stannous chloride
286	G	Sulphuric acid, conc.
288		,, ,, , dil.

500 ml REAGENT, narrow neck, enamel or sandblast label		
340		Acetic acid, dil.
342		,, ,, , glacial
344		Ammonium hydroxide, conc.
346		,, ,, , dil.
348		Barium chloride
350	G	Hydrochloric acid, conc.
352		,, ,, , dil.
354	GA	Nitric acid, conc.
356		,, ,, , dil.
358	A	Silver nitrate
360		Sodium hydroxide
362	G	Sulphuric acid, conc.
364		,, ,, , dil.

60 ml DROPPER, enamel label only	
400	Litmus (pH 5·0—8·0)
402	Methyl orange (pH 2·9—4·6)
404	Methyl orange, screened (pH 2·9—4·6)
406	Phenolphthalein (pH 8·3—10·0)
408	Starch indicator
410	Universal indicator (pH 3·0—11·0)

CODES A = Amber glass bottle G = glass stoppered bottle.

Gallenkamp LABELLED REAGENT BOTTLES

STOCK RANGE

BT-400

BOTTLES, enamel label, narrow neck, **stock range** with titles from appropriate sections of list on opposite page.

Capacity	60	250	500 ml	
Bottle type	dropper	reagent	reagent	
Title Nos.	400/410	200/288	340/364	
Dozen	**84/–**	**58/–**	**72/–**	*a*
Three	**22/–**	**15/3**	**18/9**	
Each	**8/–**	**6/2**	**7/2**	

Reagent bottles with titles from list opposite but on different size bottles see List No. BT-420.

SU-710
SU-712
STOPPERS, polypropylene, interchangeable, in several colours suitable for colour coding above bottles. For prices see entries in List No. sequence.

BT-402

BOTTLES, enamel label, narrow neck with **blank label** and border, for user inscription. Clear glass with polypropylene stoppers.

Capacity	60	125	250	500 ml	
Bottle type	dropper	reagent	reagent	reagent	
Dozen	**84/–**	**54/–**	**58/–**	**72/–**	*a*
Three	**22/–**	**14/–**	**15/3**	**18/9**	
Each	**8/–**	**5/10**	**6/2**	**7/2**	

BT-404

BOTTLES, enamel label, wide neck with **blank label** and border, for user inscription. Clear glass with ground glass stoppers.

Capacity	125	250	500 ml	
Dozen	**60/–**	**64/–**	**78/–**	*a*
Three	**15/6**	**16/9**	**20/6**	
Each	**6/2**	**6/6**	**7/8**	

BT-406

BOTTLES, sandblast label, narrow neck, **stock range** with titles from appropriate sections of list on opposite page.

Capacity	250	500 ml	
Title Nos.	200/288	340/364	
Dozen	**66/–**	**80/–**	*a*
Three	**17/6**	**21/–**	
Each	**6/10**	**7/10**	

Bottles with titles from list opposite but on different size bottles see List No. BT-430.

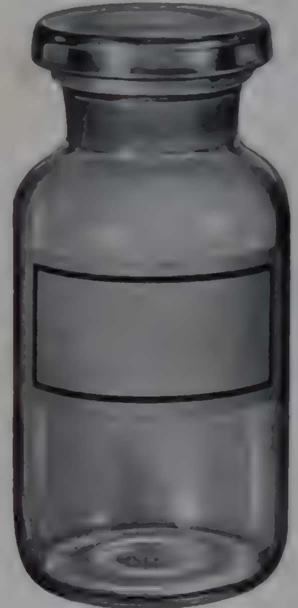
NOTE: QUANTITY RATES for bottles BT-400 and BT-406 apply to orders for mixed titles as well as to single titles.

UNIVERSAL
INDICATOR
PH 3·0–11·0

BT-400
dropper

HYDROCHLORIC
ACID DIL.

BT-400
reagent



BT-404

NITRIC
ACID CONC.

BT-406

All above items normally available from stock.

LABELLED BOTTLES WITH OTHER LISTED TITLES

Titles in the list on page 80 are in regular demand, but the quantities usually required of any one title on any one size of bottle are not sufficient to warrant maintenance of regular stocks of the enormous number of possible permutations.

Silk screen stencils for enamel labels and (except for indicators) sandblast stencils, are maintained at our factory for printing to customer's order. The list of titles available is coded to indicate the type of bottle supplied as appropriate to the reagent to be stored in it.

It should be noted that several titles in this list are synonyms or minor variants of titles listed in the stock range on page 78. In such cases the more systematic or logical variant in greatest general demand is listed in the stock range and, due to quantity production, is priced more economically.

The List Nos. and prices in this section also apply to titles from the stock range on page 78 on bottles of capacities not included under BT-400 and BT-406.

When bottles are printed in small quantities of one title, the cost of preparing the stencil and setting up the machine becomes a substantial portion of the total cost. Thus the differential in price between each and quantity rates is considerably greater on bottles printed to order than it is for the stock range.

For the reasons given above, the quantity rates listed for bottles printed to order apply only to quantities of bottles all printed with one title.

Gallenkamp LABELLED REAGENT BOTTLES

OTHER LISTED TITLES

CODES A = Amber glass bottle. G = Glass stoppered bottle. D = Dropper bottle (enamel label only). W = Wide neck bottle.

No.	Code	Title
450		Acetic acid
452		,, ,, , conc.
454	G	,, anhydride
456	G	Acetyl chloride
458		Alcohol
460		,, absolute
462		,, rectified spirit
464		Alizarin
466	GW	Aluminium, metal
468		Aluminon
470		Ammonia
472	GW	Ammonium acetate, cryst.
474	GW	,, chloride, cryst.
476		,, hydroxide
478		,, ,, 0·880
480	GW	,, iodide, cryst.
482		,, nitrate
484		,, persulphate
486		,, phosphate
488		,, sulphate
490		,, thiocyanate
492	G	Amyl acetate
494		,, alcohol
496	GW	Asbestos
506		Barfoed's Reagent
508		Barium carbonate
510	D	,, diphenylamine p-sulphonate
512		Barium hydroxide
514		,, nitrate
516		Benedict's reagent
518		1—Benzoin oxime
520		Boric acid
522	GW	Borax
524	G	Bromine
526	D	Bromocresol green (pH 3·6—5·2)
528	D	Bromocresol purple (pH 5·2—6·8)
530	D	Bromophenol blue (pH 2·8—4·6)
532	D	Bromothymol blue (pH 6·0—7·6)
534	G	Butyl acetate
536		,, alcohol
546		Cacotheline
548	GW	Calcium carbonate
550	GW	,, fluoride
552		,, hydroxide
554		,, sulphate, satd.
556	GA	Carbon disulphide
558	GW	Charcoal
560	GA	Chlorine water
562	G	Chromic acid/sulphuric acid
564	GW	Citric acid, cryst.
566		Cobalt nitrate
568		Copper acetate
570	GW	,, oxide
572		,, sulphate
574	GW	Copper, turnings

No.	Code	Title
584	GW	Devarda's alloy
586		Dimethyl glyoxime
588	D	,, yellow (pH 2·8—4·6)
590		2 : 4 Dinitrophenylhydrazine
592		Diphenylamine
594		Distilled water
604	G	Ethyl acetate
606	D	Eriochrome
616		Ferrous ammonium sulphate
618	GW	Ferrous sulphate
620	GW	Filter paper pulp
622		Formaldehyde
624		Fuchsin
626	GW	Fusion mixture
636	GW	Glass wool
638	GW	Glucose
640		Glycerol
650		Hydrochloric acid
652	A	Hydrogen peroxide
654		Hydroxylamine
656		8-Hydroxyquinoline
666		Iodine
668		Iodine in potassium iodide
670	GW	Iron wire
672	GW	Iron filings
674		Isopropyl alcohol
684	GW	Lead dioxide
686		,, nitrate
688		Litmus papers
698	GW	Magnesia mixture
700		Magnesium nitrate
702		,, sulphate
704		Magneson
706	GW	Manganese dioxide
708		Manganous chloride
710	D	Methyl red (pH 4·2—6·3)
712		Methylated spirit
714	D	Methylene blue
716		Millon's reagent
718	D	Murexide
728		2–Naphthol
730	A	Nessler's reagent
732	A	Nitric acid
734	GA	,, ,, , fuming
736		1–Nitroso 2–Naphthol
746		Oxalic acid
748	GW	,, ,, , cryst.
758	GA	Perchloric acid
760	G	Petroleum ether

No.	Code	Title
762	G	Petroleum ether 40/60°
764	G	,, ,, 60/80°
766	G	,, ,, 80/100°
768	G	,, ,, 100/120°
770	D	Phenol red (pH 6·8—8·4)
772	G	Phosphoric acid
774		Picric acid
776		Potassium aluminium sulphate
778		,, bromide
780		,, chloride
782		,, cyanide
784		Pyridine
786	A	Pyrogallol
796		Schiff's reagent
798	GW	Silica
800	GW	,, gel
802	GW	Soda lime
804	GW	Sodium, metal
806		,, acetate
808	GW	,, ,, , cryst.
810		,, bicarbonate
812		,, bismuthate
814	GW	,, carbonate, anhydrous
816		Sodium chloride
818		,, cobaltinitrite
820		,, diaminoethane tetracetate
822		Sodium fluoride
824		,, hydrogen phosphate
826		,, ,, tartrate
828		,, hydroxide, dil.
830	A	,, hypochlorite
832		,, nitrate
834	GW	,, nitrite, cryst.
836	GW	,, nitroprusside
838	GW	,, peroxide
840		,, sulphate
842	GW	,, ,, anhydrous
844		,, sulphide
846		,, thiosulphate
848	GW	Starch iodide papers
850	GW	Sucrose
852	GW	Sulphur
854		Sulphuric acid
856		Sulphurous acid
866	GW	Tartaric acid, cryst.
868	GW	Test papers
870	D	Thymolphthalein (pH 9·3—10·5)
872	GW	Tin, metal
874	G	Toluene
876	GA	Trichlorethylene
878		Triethanolamine
888	G	Xylene
898	GW	Zinc, dust
900	GW	,, , granulated
902	GW	,, ,, arsenic free
904		,, uranyl acetate
906		Zirconium nitrate

Gallenkamp LABELLED REAGENT BOTTLES

OTHER LISTED TITLES

BT-420

BOTTLES, enamel label, narrow neck, with titles from list on opposite page, also with titles from stock list on page 78 on bottle sizes not included under BT-400.

Capacity	60	125	250	500 ml	
Bottle type	dropper	reagent	reagent	reagent	
Dozen	**112/–**	**82/–**	**86/–**	**96/–**	*a*
Three	**35/–**	**27/–**	**28/–**	**30/–**	
Each	**12/9**	**10/–**	**10/6**	**11/6**	

BT-425

BOTTLES, enamel label, wide neck, with titles from list on opposite page.

Capacity	125	250	500 ml	
Dozen	**86/–**	**92/–**	**104/–**	*a*
Three	**28/–**	**29/–**	**32/–**	
Each	**10/6**	**11/–**	**12/3**	

BT-430

BOTTLES, sandblast label, narrow neck, with titles from list on opposite page, also with titles from stock list on page 78 on bottle sizes not included under BT-406.

Capacity	125	250	500 ml	
Dozen	**76/–**	**80/–**	**90/–**	*a*
Three	**23/–**	**24/–**	**27/–**	
Each	**9/3**	**9/6**	**10/6**	

BT-435

BOTTLES, sandblast label, wide neck, with titles from list on opposite page.

Capacity	125	250	500 ml	
Dozen	**80/–**	**86/–**	**98/–**	*a*
Three	**24/–**	**26/–**	**29/–**	
Each	**9/6**	**10/–**	**11/–**	

NOTE: QUANTITY RATES for bottles BT-420 to BT-435 apply only to quantities of one title.

LABELLED BOTTLES WITH SPECIAL TITLES MADE TO INDIVIDUAL REQUIREMENTS

However comprehensive may be a list of titles, there will always be special requirements to suit the particular purposes of individual laboratories. For this reason we have introduced enamel label bottles with blank labels for the user to add the inscription by means of paint, wax pencil, etc. This method is economical for temporary usage but in cases where the requirement is a long term one then a factory printed label to match other bottles may be required. To meet this requirement we are able to make stencils to order and to supply bottles labelled from them. The quantity price differentials are subject to similar considerations to those described in the preceding section—and it is naturally a relatively expensive process for small quantities.

When a special title stencil is made to order, it will be kept in store at our factory for two years. The customer requiring a repeat order within this period may obtain the benefit of lower prices **provided that the order is clearly identified** by marking 'special stencil previously made on (date)' and preferably identified with the appropriate List No. in the BT-420 to BT-435 series, at which prices the order will then be invoiced.

BT-450

BOTTLES, enamel label, narrow neck, with special titles not included in our lists.

Capacity	60	125	250	500 ml	
Bottle type	dropper	reagent	reagent	reagent	
2 Dozen	**276/–**	**216/–**	**224/–**	**244/–**	*a*
Dozen	**162/–**	**132/–**	**136/–**	**146/–**	
Six	**102/–**	**87/–**	**89/–**	**94/–**	
Three	**64/–**	**57/–**	**58/–**	**60/–**	
Each	**33/–**	**30/–**	**31/–**	**32/–**	

Reagent bottles will be supplied in clear glass with polypropylene stoppers unless otherwise specified on order.

BT-455

BOTTLES, as BT-450 but **wide neck, with ground glass stoppers.**

Capacity	125	250	500 ml	
2 Dozen	**224/–**	**236/–**	**260/–**	*a*
Dozen	**136/–**	**142/–**	**154/–**	
Six	**89/–**	**91/–**	**96/–**	
Three	**58/–**	**59/–**	**61/–**	
Each	**30/6**	**31/6**	**33/–**	

Bottles will be supplied in clear glass unless amber is specified on the order.

BT-460

BOTTLES, sandblast label, narrow neck, with special titles not included in our lists.

Capacity	125	250	500 ml	
2 Dozen	**174/–**	**182/–**	**202/–**	*a*
Dozen	**111/–**	**105/–**	**115/–**	
Six	**64/–**	**66/–**	**72/–**	
Three	**40/–**	**41/–**	**44/–**	
Each	**19/9**	**20/–**	**21/–**	

Bottles will be supplied in clear glass with polypropylene stoppers unless otherwise specified on order.

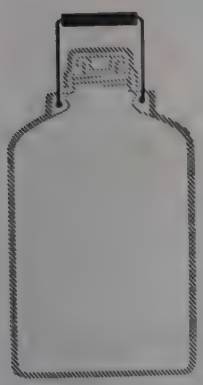
BT-465

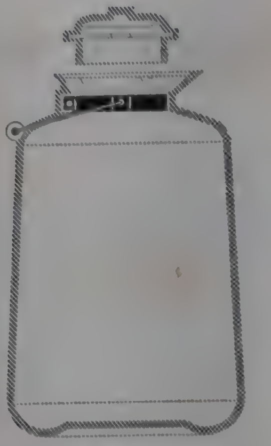
BOTTLES, as BT-460 but **wide neck,** with ground glass stoppers.

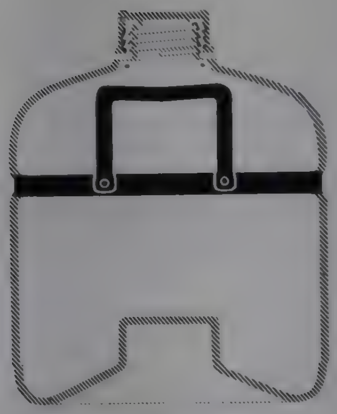
Capacity	125	250	500 ml	
2 Dozen	**182/–**	**194/–**	**218/–**	*a*
Dozen	**115/–**	**111/–**	**123/–**	
Six	**66/–**	**69/–**	**76/–**	
Three	**41/–**	**42/–**	**46/–**	
Each	**20/–**	**21/–**	**22/–**	

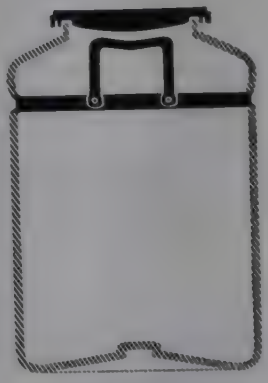
Bottles will be supplied in clear glass unless amber is specified on the order.

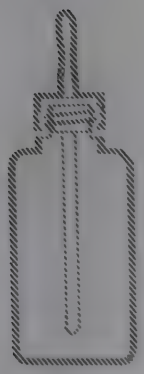
NOTE: QUANTITY RATES for bottles BT-450 to BT-465 apply only to quantities of one title.

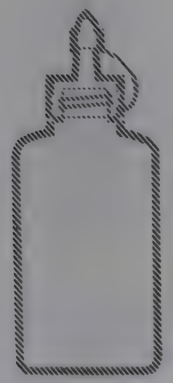

BT-500

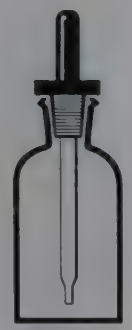

BT-505

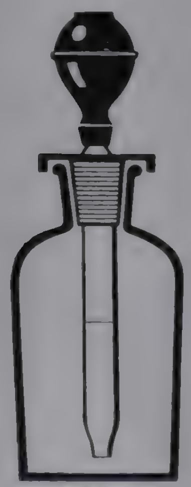

BT-510

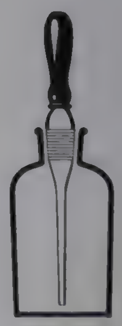

BT-515


BT-540


BT-545


BT-550


BT-552


BT-555

LARGE CAPACITY PLASTICS BOTTLES

BT-500

BOTTLES, rigid polythene, with internal leak proo closure protected by screw cap. Neck diameter 63 mm.

Capacity	4·5	9	22 litres	
Each	**12/–**	**16/6**	**42/–**	c

BT-505

BOTTLE, polythene, 9 litre capacity. With easy-pour spout, lid and pivoted handle ... Each **£0.18.11.** *m*

BT-510

BOTTLES, thick polythene, with screw on cap and lifting handles.

Capacity	15	25	50 litres	
Diameter	32	32	38 cm	
Each	**58/–**	**70/–**	**108/–**	*m*

BT-515

BOTTLES, rigid polythene, with 18 cm diameter wide mouth for easy filling, closed by a tight push-on cap. With lifting handles.

Capacity	15	25	50 litres	
Diameter	32	32	38 cm	
Each	**58/–**	**70/–**	**108/–**	*m*

BOTTLES, DROPPING & DISPENSING

BT-540

BOTTLES, dropping, polythene with screw cap, vinyl teat and polythene pipette.

Capacity	60	125 ml	
Dozen	**54/–**	**59/–**	*m*
Each	**5/10**	**6/2**	

BT-545

BOTTLES, dispensing, polythene with screw cap fitted with elongated spout and closure.

Capacity	60	125	250	500 ml	
Dozen	**13/6**	**14/9**	**35/–**	**41/–**	*m*
Each	**2/9**	**2/10**	**4/5**	**4/10**	

BT-550

BOTTLES, dropping, glass, with 16/16 interchangeable plastics stopper, vinyl teat and glass pipette.

Capacity	30	60	125 ml	
Dozen	**48/–**	**51/–**	**59/–**	*m*
Each	**5/4**	**5/8**	**6/2**	

BT-552

BOTTLES, dispensing, glass with 24/20 interchangeable plastics stopper, vinyl bulb and graduated glass pipette.

Capacity	250	500 ml	
Pipette	5	5 & 10 ml	
Std. pack of 6	**49/6**	**55/–**	*m*
Each	**9/–**	**9/9**	

BT-555

BOTTLES, dropping, glass, with ground-in pipette stopper and rubber teat.

Capacity	15	30	60	125 ml	
Dozen	**48/–**	**51/–**	**54/–**	**59/–**	*o*
Each	**5/4**	**5/8**	**5/10**	**6/2**	

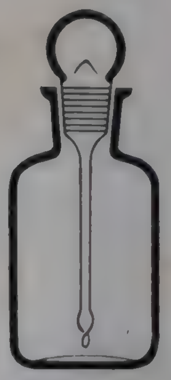
All items on this page normally available from stock.

BOTTLES, DROPPING AND DISPENSING

(continued)

BT-560

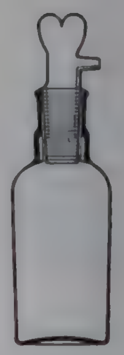
BOTTLE, dropping, glass, with ground-in peg stopper having rod fixed to the inside. Capacity 30 ml.
Dozen **£2. 10. 0.** Each **£0. 5. 6.** c


BT-560

BT-565

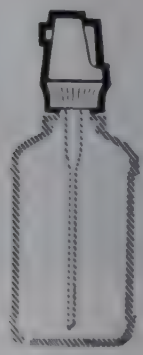
BOTTLES, dropping, TK pattern, glass, with ground-in slotted stopper.

Capacity	30	60	100 ml	
Std. pack qty.	36	36	36	
Std. pack	**72/–**	**79/–**	**84/–**	d
Dozen	**25/–**	**27/–**	**29/–**	


BT-565

BT-574

BOTTLE CAP, spraying, press button pattern which delivers liquid as a finely atomised spray. The liquid contacts only polythene and stainless steel. With 11 cm polythene dip-tube and R3/24 neck thread which fits 250 ml bottles BT-172, BT-174 and BT-190 or 125 ml bottles BT-172 and BT-174.
Dozen **£1. 10. 0.** Each **£0. 4. 0.** c


BT-574 with bottle

BT-576

BOTTLE CAP, dispensing, press button pattern, construction as BT-574, but dispenses approx. 0·75 ml of liquid per stroke. With 11 cm polythene dip-tube and R3/24 neck thread which fits bottles as BT-574.
Dozen **£1. 10. 0.** Each **£0. 4. 0.** c

BT-580

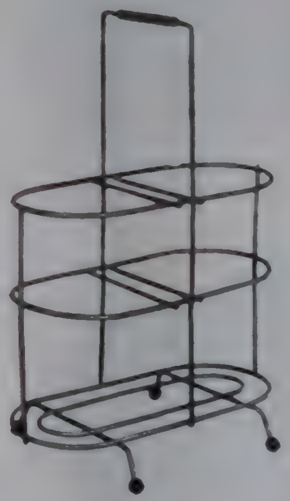
BOTTLE CAP, dispensing, polythene bellows pattern, delivers approx. 30 ml of liquid per stroke. The tapered stopper fits bottles with neck internal diameters from 14 to 20 mm. With 25 cm polythene dip-tube.
Each **£0. 7. 6.** m

BT-580 with bottle

BOTTLE CARRIERS AND DRIP TRAYS

BT-600

BOTTLE CARRIER, polythene covered strong steel rod. Suitable for 2 Winchester bottles but will accept most types of bottle up to 13·7 cm diam. Overall height 47 cm ... ... Dozen **£15. 10. 0.** Each **£1. 8. 0.** c


BT-600

BT-610

BOTTLE CARRIER, polythene, to take Winchester series bottles 80 or 90 oz size, liquid tight, with carrying handle, pivoted for easy pouring. This carrier forms a very convenient means of carrying and handling Winchester bottles of dangerous acids in safety. Each **£3. 12. 6.** m

BT-610

BT-640

BOTTLE TRAYS, polypropylene, to take single bottles. The bottle stands on raised ribs inside the tray which prevents drips damaging the bench.

Diameter	7	9·5	11·5	13	15 cm	
Max. bottle capacity	0·25	0·5	1	2	5 litre	
Pack of 12	**13/–**	**22/6**	**40/–**	**40/–**	**51/6**	m
Each	**2/9**	**3/6**	**4/10**	**4/10**	**5/8**	

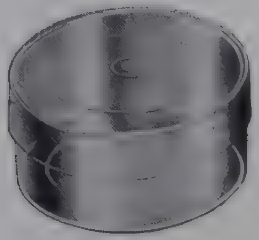
BT-640

All items on this page normally available from stock.

BT-820

MOUNTING BOXES, clear polystyrene, circular with close fitting lid. For mounting entomological specimens if a cork bottom is used. In packs of 12.

Diameter	50 mm	60 mm	
Depth	25 mm	22 mm	
Dozen packs	**72/–**	**94/–**	c
Pack	**7/2**	**8/9**	


BT-820

BT-840

BOX, clear polystyrene, squat square shape, with internal fitting lid. Height 87×100 mm square.
Dozen **£1. 12. 0.** Each **£0. 4. 2.** c

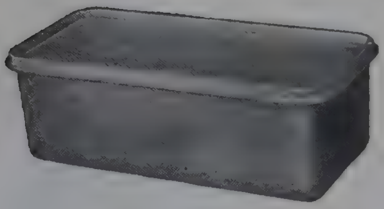
BT-842

BOX, clear polystyrene, as BT-840, but rectangular shape. Nominal dimensions 20×10×8·5 cm deep.
Dozen **£2. 11. 0.** Each **£0. 5. 8.** c

BT-840 BT-842

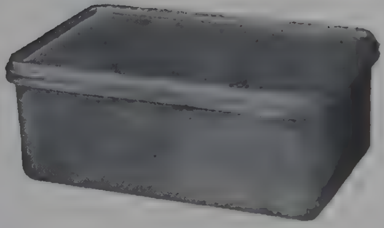
BT-850

BOX, polythene, rectangular with press-on sealing lid. Nominal dimensions 21 × 11 × 6·5 cm deep.
Dozen **£3. 8. 0.** Each **£0. 6. 10.** c


BT-850

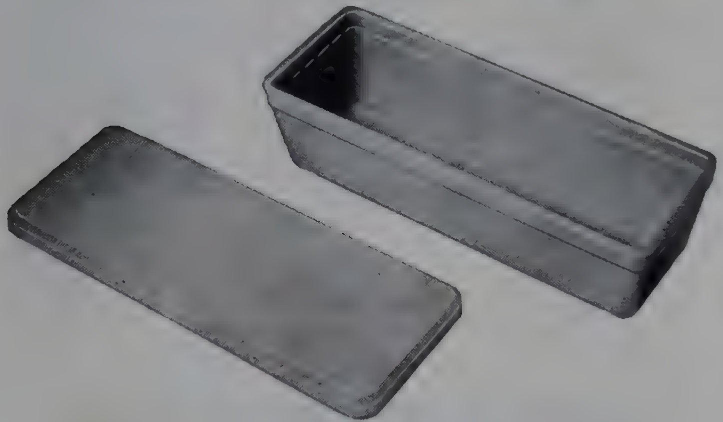
BT-852

BOX, polythene, rectangular, as BT-850 but nominal dimensions 21 × 14 × 7 cm deep.
Dozen **£4. 14. 0.** Each **£0. 8. 9.** c


BT-852

BT-860

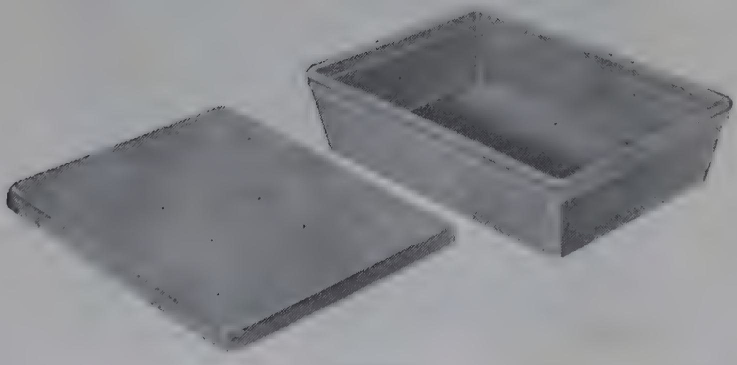
BOX, polypropylene, rectangular shape with tapered sides and loose fitting lid. Suitable for use as an instrument tray. Nominal internal dimensions 20×7×5 cm deep.
Dozen **£3. 6. 0.** Each **£0. 6. 8.** c


BT-860

BT-862

BOX, polypropylene, as BT-860 but with nominal internal dimensions 20 × 15 × 5 cm deep.
Dozen **£5. 18. 0.** Each **£0. 10. 9.** c

DISH, polypropylene, matching above boxes see DM-270 in List No. sequence.


BT-862

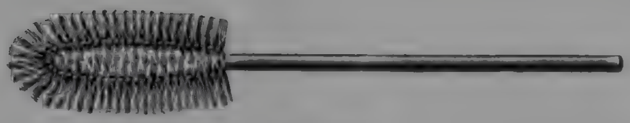
BOXES, glass top, specimen
see BIOLOGICAL SCIENCES

BOXES, postal, for specimen tubes
see TUBES, specimen

BOXES, sterilising see STERILISING EQUIPMENT

All items on this page normally available from stock.

BRUSHES



BU-430

BU-430

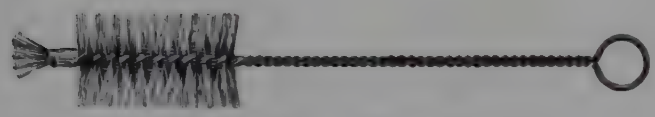
BRUSH, beaker, with bristles 15 mm long forming a head 15 cm long × 7 cm diameter at widest part, on hardwood handle. Overall length 40 cm.

Dozen **£1. 0. 6.** Each **£0. 3. 3.** c

BU-434

BRUSH, beaker, black hair with fan end, 15 × 7 cm on hardwood handle. Overall length 40 cm.

Dozen **£7. 0. 0.** Each **£0. 12. 9.** c



BU-440 BU-442

BU-440

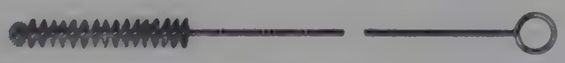
BRUSHES, bottle, white fibre on galvanised wire.

Size No.	1	2	3	4	5	
Length of head	5	6	7·5	10	15 cm	
Dia. of head	4	4·5	5	6	7 cm	
Overall length	25	30	35	40	45 cm	
Dozen packs	**62/–**	**80/–**	**88/–**	**104/–**	**120/–**	c
Pack of 10	**6/4**	**7/10**	**8/3**	**9/6**	**11/–**	

BU-442

BRUSHES, bottle, white nylon on galvanised wire.

Size No.	1	2	3	4	5	
Length of head	5	6	7·5	10	15 cm	
Dia. of head	4	4·5	5	6	7 cm	
Overall length	25	30	35	40	45 cm	
Dozen	**9/6**	**10/–**	**13/–**	**16/–**	**25/–**	c
Each	**2/6**	**2/6**	**2/9**	**2/11**	**3/8**	

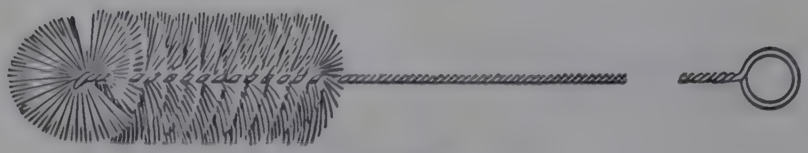


BU-460

BU-460

BRUSHES, burette, stiff white bristle on galvanised wire.

Suitable for burette capacity	10	25	50	100 cm³	
Dia.	13	16	19	25 mm	
Overall length	50	60	75	90 cm	
Dozen packs	**74/–**	**82/–**	**96/–**	**114/–**	c
Pack of 10	**7/4**	**7/10**	**9/–**	**10/3**	

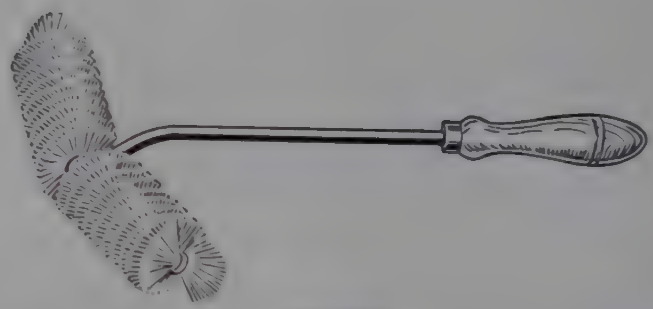


BU-480

BU-480

BRUSHES, cylinder, stiff white nylon, fan shaped end on strong galvanised wire.

Length of head	12	14 cm	
Dia. of head	6	7 cm	
Overall length	65	65 cm	
Dozen	**36/–**	**40/–**	c
Each	**4/6**	**4/9**	

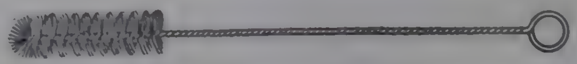


BU-520

BU-520

BRUSHES, flask, stiff white nylon, on galvanised wire with curved head, hinged joint and hardwood handle.

Length of head	10	17 cm	
Dia. of head	5	5 cm	
Suitable for flasks	1–3	over 3 litres	
Flask neck min. dia.	3	4·5 cm	
Dozen	**38/–**	**44/–**	c
Each	**4/7**	**5/–**	



BU-550 BU-552

BU-550

BRUSHES, test tube, white fibre with fan shaped end on galvanised wire.

For test tubes	10 to 12	16 to 25 mm	
Dozen packs	**41/–**	**49/–**	c
Pack of 10	**4/10**	**5/6**	

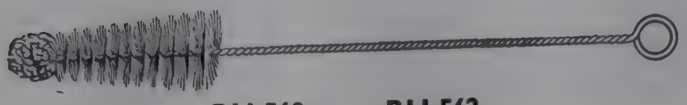
BU-552

BRUSHES, test tube, white nylon with fan shaped end on galvanised wire.

For test tubes	10 to 12	16 to 25 mm	
Dozen packs	**47/–**	**59/–**	c
Pack of 10	**5/4**	**6/2**	

All items on this page normally available from stock.

BRUSHES
(continued)



BU-560 BU-562

BU-560

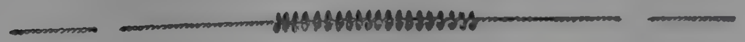
BRUSHES, test tube, white bristle with cotton yarn tip on galvanised wire.

For test tubes	12 to 16	19 to 25 mm	
Dozen packs	49/–	64/–	c
Pack of 10	5/6	6/6	

BU-562

BRUSHES, test tube, white nylon with cotton yarn tip on galvanised wire.

For test tubes	12 to 16	19 to 25 mm	
Dozen packs	62/–	72/–	c
Pack of 10	6/4	7/2	

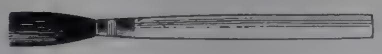


BU-580

BU-580

BRUSHES, tube, stiff white nylon set into centre of galvanised wire for cleaning tubes open at both ends.

Dia.	3	6	12 mm	
Overall length	40	40	60 cm	
Dozen packs	80/–	80/–	80/–	c
Pack of 10	7/10	7/10	7/10	

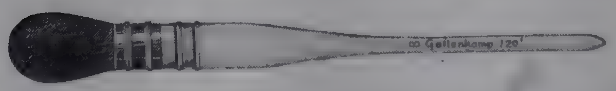


BU-600

BU-600

BRUSHES, squirrel hair, in quill holders.

Size	Small	Medium	Large	
Dozen packs	90/–	120/–	160/–	c
Pack of 10	8/6	11/–	14/6	

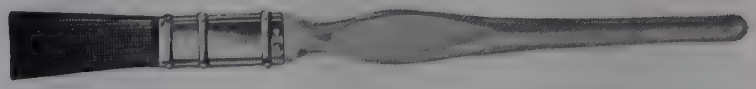


BU-610

BU-610

BRUSHES, mop or dabber. Squirrel hair securely mounted in wooden handle.

Size No.	2	4	8	
Dia. approx.	6	9	15 mm	
Dozen	68/–	88/–	165/–	c
Each	6/10	8/3	15/–	

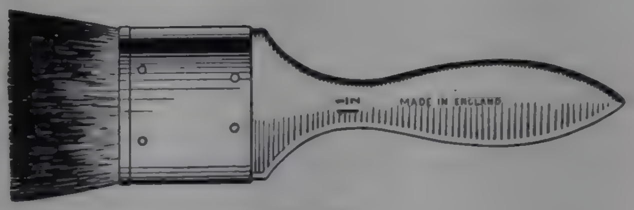


BU-615

BU-615

BRUSH, flat form bristle, 12 mm wide for cleaning or dusting in confined spaces.

Dozen **£1. 13. 0.** Each **£0. 4. 3.** c

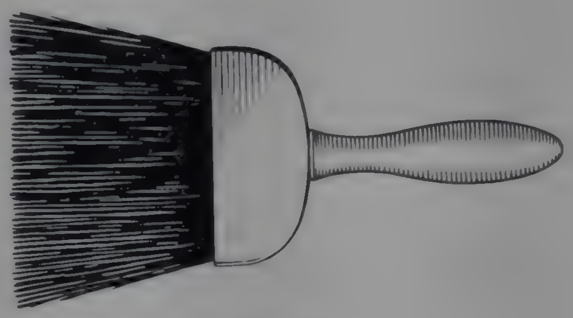


BU-620

BU-620

BRUSHES, squirrel hair, flat form in metal mount on wooden handle.

Width	2·5	4	5 cm	
Dozen	74/–	100/–	135/–	c
Each	7/4	9/3	12/3	



BU-640

BU-640

BRUSH, dusting, flat form, with soft bristles 10 cm long, in wooden handle.

Dozen **£4. 16. 0.** Each **£0. 9. 0.** c

BU-680

BU-680

BRUSH, cleaning, polythene bristles set into toughened polystyrene handle. Overall length 26 cm.

Pack of 6 **£0. 15. 0.** c

All items on this page normally available from stock.

BUCKETS

BV-430

BUCKET, polythene, with lid and rigid polythene handle, capacity 7 litres, dia. 23 cm, depth 23 cm with embossed graduation in litres and pints.

Each **£0. 15. 5.** *m*

BV-435

BUCKET, polypropylene, with handle but without pouring lip. Capacity 9 litres, dia. 24 cm, depth 24 cm.

Each **£0. 15. 6.** c

BV-440

BUCKET, rigid polythene, with pouring lip and polythene covered steel handle. Capacity 10 litres, graduated on inside of bucket, dia. 29 cm, depth 29 cm.

Each **£1. 13. 0.** c

BV-470

BUCKET, stainless steel, seamless, with pouring lip and handle. Capacity 12 litres, dia. 30 cm, depth 26 cm.

Each **£3. 14. 0.** c

BV-430

BV-470

BULBS, absorption see ABSORPTION APPARATUS
, rubber see RUBBER SUNDRIES
BUNSEN BURNERS see BURNERS

All above items normally available from stock.

The three A's of Automation in the Fuel Laboratory

AUTOBOMB

AUTOMATIC

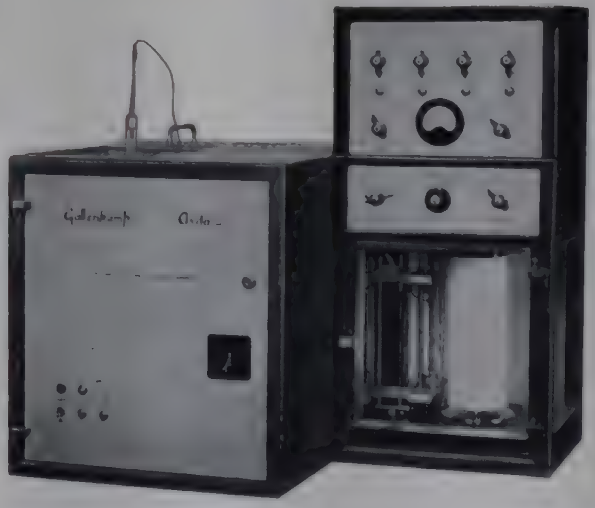
ADIABATIC BOMB CALORIMETER CB-100

Gallenkamp

ASDA

AUTOMATIC

STANDARD DISTILLATION APPARATUS PE-700



AUTOFLASH

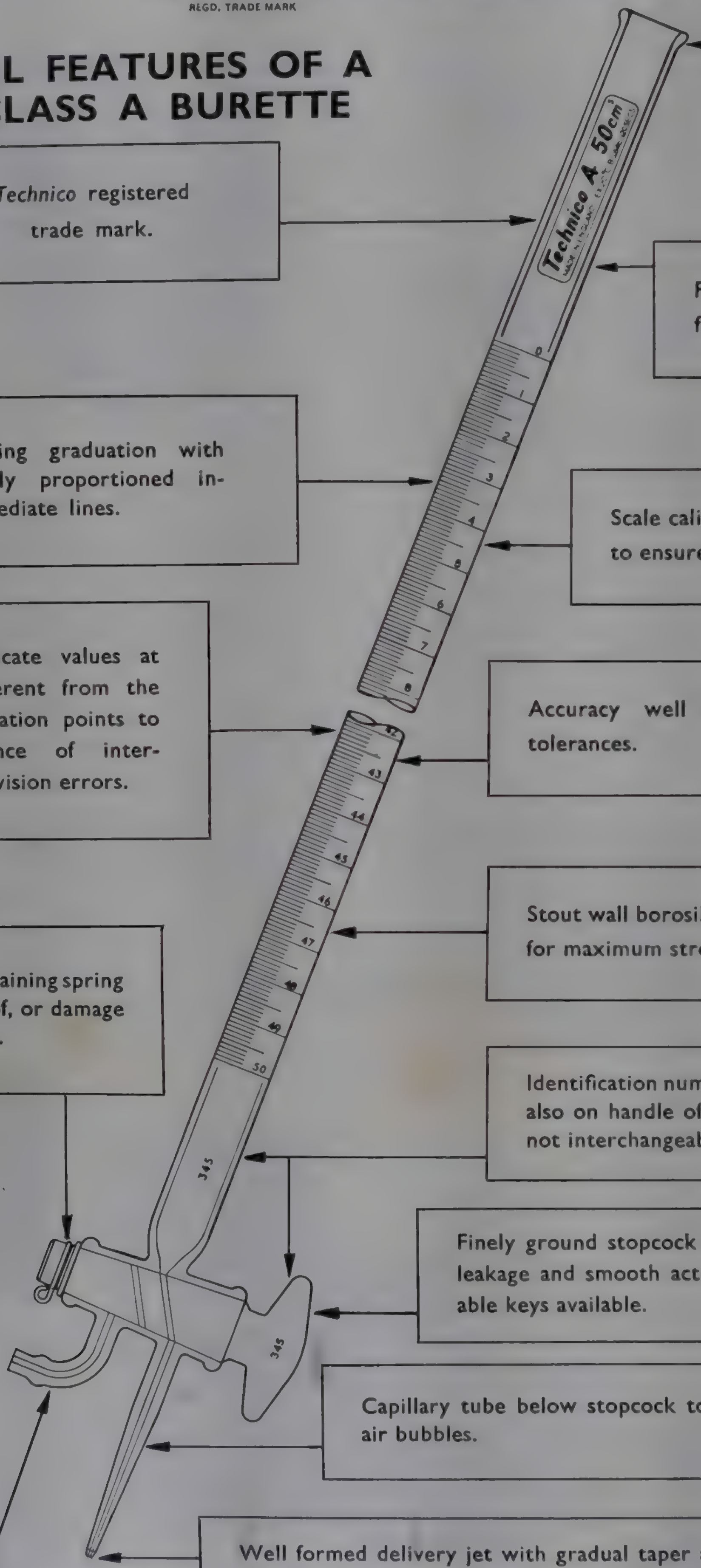
AUTOMATIC

PENSKY-MARTENS FLASH-POINT APPARATUS PF-070

Technico BURETTES

REGD. TRADE MARK

ESSENTIAL FEATURES OF A GOOD CLASS A BURETTE



Strongly formed reinforced rim.

Technico registered trade mark.

Full BS inscription including flow time.

Full ring graduation with properly proportioned in-intermediate lines.

Scale calibrated at five points to ensure uniform accuracy.

Works certificate values at 5 points different from the original calibration points to ensure absence of intermediate subdivision errors.

Accuracy well within BS tolerances.

Stout wall borosilicate tubing for maximum strength.

Rust resistant retaining spring to prevent loss of, or damage to, stopcock key.

Identification number on tube also on handle of stopcock if not interchangeable.

Finely ground stopcock to ensure freedom from leakage and smooth action in use. Interchangeable keys available.

Capillary tube below stopcock to avoid trapped air bubbles.

Improved inlet bend to store flat and reduce breakage.

Well formed delivery jet with gradual taper and finely ground end and bevel, accurately timed to provide a fast outflow within BS tolerances.

When ordering specify *Technico* Volumetric Glassware.

SOME OF THE REASONS FOR THE SUPERIORITY AND ACCURACY OF *Technico* BURETTES

REGD. TRADE MARK

DESIGN

BS 846 is the basis of general design, tolerance and performance of all *Technico* burettes. Some burettes in this catalogue are not included in the British Standard but the same considerations of tolerance and performance are used as far as is appropriate.

All *Technico* burettes are manufactured in our own works.

GRADUATION

All burettes (except Schellbach) are made from machine drawn tubing which ensures the most uniform accuracy of bore. The scale is calibrated at a liberal number of points and subdivided by means of the most modern precision automatic machinery.

All *Technico* Class A burettes are made from borosilicate glass.

STOPCOCKS

Stopcocks are of substantial size, fine precision ground to ensure years of smooth trouble-free operation. The corrosion resistant retaining spring provides a smooth constant pressure of engagement and prevents accidental leakage or damage through the key working loose. All burette stopcocks, both straight bore and double oblique bore patterns, have the same diameter at the small end of the key and use the same size of retaining spring. Replacement springs ST-650 will be found listed under STOPCOCKS.

Stopcocks with interchangeable grinding are fitted to some burettes as indicated in the specifications. They can also be fitted to some other burettes at extra cost to order. Quotations on application.

Full details of (AG) interchangeable stopcocks and replacement keys will be found under STOPCOCKS.

JETS

Jets are well formed with a gradual taper and finely ground end and bevel. Timing is carried out by a new process which makes it possible to control within very narrow limits the rate of outflow. We are thus able to offer for the first time burettes which have a rate of flow near the fastest limit permitted by the tolerances in BS 846. This factor means that *Technico* **burettes combine accuracy with a speed of use** never before obtained in routine production.

GENERAL INFORMATION

Useful information on burettes and other items of volumetric glassware with regard to methods of use, accuracy, cleaning and other matters will be found under the title VOLUMETRIC GLASSWARE·

Extract from BS 846
'Burettes and bulb burettes'
Tolerances on capacity.

Nominal capacity	Subdivision	Class A tolerance	Class B tolerance
cm^3	cm^3	± cm^3	± cm^3
1	0·01	0·006	0·01
2	0·02	0·01	0·02
5	0·05	0·02	0·04
10	0·02	0·01	0·02
10	0·1	—	0·05
25	0·05	0·03	0·05
25	0·1	0·05	0·1
50	0·1	0·05	0·1
100	0·2	0·1	0·2

CERTIFICATION

The national authority for the independent testing and certification of items of volumetric glassware was transferred in January 1965 from the National Physical Laboratory to the British Standards Test Centre. The former NPL mark and certificate are thus replaced by BST. A new British Calibration Service is in process of formation and it appears likely that there may be a further change of marking at a later date.

BURETTES

Without stopcock
See illustration on next page

BW-044

BURETTES, *Technico*, **Class B**, with nipple end, for use with pinchclip and jet.

To deliver	25	50 cm^3	
Subdivided in	0·1	0·1 cm^3	
Dozen	**118/–**	**135/–**	*a*
Each	**10/9**	**12/3**	

BW-050

BURETTE JETS, for use with BW-044, in packs of 6.
Dozen packs **£2. 3. 0.** Pack **£0. 5. 0.** *a*

CP-220	**Clips, Mohr,** suitable for use with BW-044.	For prices see entries in List No. sequence.
BW-840	**Burette valve,** suitable for use with BW-044.	

BURETTES

With straight bore stopcock
See illustration on next page

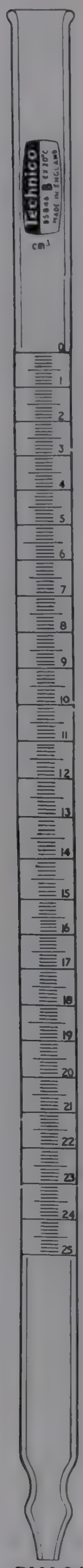
BW-084

BURETTES, *Technico*, **Class B**, with straight bore stopcock. The sizes marked * are fitted with an enlarged tube at the top for easy filling.

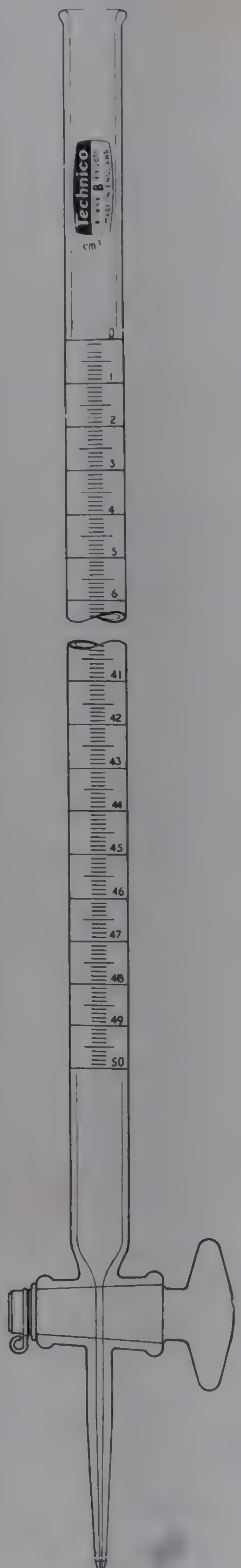
To deliver	1*	2*	5*	10	10* cm^3	
Subdivided in	0·01	0·02	0·05	0·1	0·02 cm^3	
Dozen	**185/–**	**185/–**	**200/–**	**160/–**	**255/–**	*a*
Each	**17/–**	**17/–**	**18/–**	**14/6**	**23/6**	

To deliver	25	25	50	100 cm^3	
Subdivided in	0·1	0·05	0·1	0·2 cm^3	
Dozen	**175/–**	**275/–**	**185/–**	**240/–**	*a*
Each	**16/–**	**25/–**	**17/–**	**22/–**	

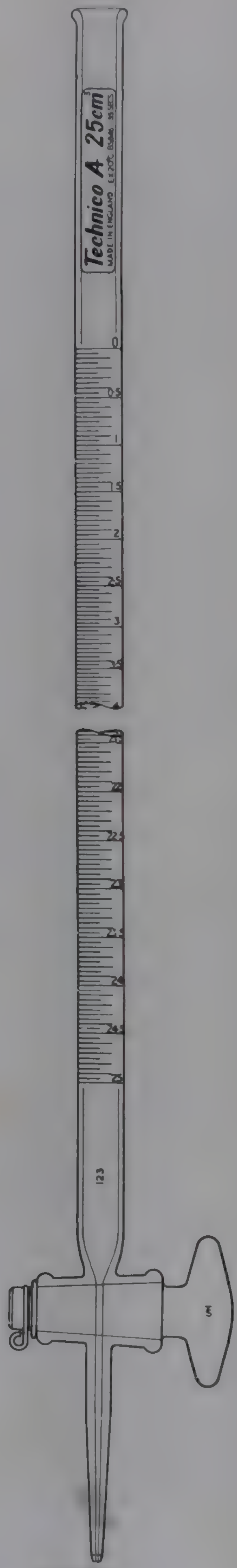
All items on this page normally available from stock.



BW-044



BW-084
BW-085



BW-086
BW-087
BW-088

ST-442 Spare stopcock keys } see entries in
ST-650 Spare retaining springs } List No. sequence.

Technico

REGD. TRADE MARK

BURETTES WITH STRAIGHT INTERCHANGEABLE STOPCOCK

BW-085

BURETTES, *Technico,* **Class B,** with **interchangeable** straight bore stopcock. The 5 and 10 cm^3 burettes are fitted with an enlarged tube at the top for easy filling.

To deliver	5	10	25	50 cm^3	
Subdivided in	0·05	0·02	0·1	0·1 cm^3	
Dozen	**245/–**	**300/–**	**215/–**	**235/–**	a
Each	**22/6**	**27/–**	**19/6**	**21/6**	

BW-086

BURETTES, *Technico,* **Class A,** with **interchangeable straight bore stopcock.** The sizes marked * are fitted with an enlarged tube at the top for easy filling. **Borosilicate glass.**

To deliver	1*	2*	5*	10* cm^3	
Subdivided in	0·01	0·02	0·05	0·02 cm^3	
Dozen	**440/–**	**440/–**	**460/–**	**590/–**	a
Each	**40/–**	**40/–**	**42/–**	**53/–**	
To deliver	25	25	50	100 cm^3	
Subdivided in	0·1	0·05	0·1	0·2 cm^3	
Dozen	**440/–**	**590/–**	**510/–**	**580/–**	a
Each	**40/–**	**53/–**	**46/–**	**52/–**	

BW-087

BURETTES, *Technico,* **Class A,** with **interchangeable straight bore stopcock,** with **works certificate** giving values at 5 test points. The sizes marked * are fitted with an enlarged tube at the top for easy filling. **Borosilicate glass.**

To deliver	1*	2*	5*	10* cm^3	
Subdivided in	0·01	0·02	0·05	0·02 cm^3	
Dozen	**590/–**	**590/–**	**600/–**	**740/–**	a
Each	**53/–**	**53/–**	**55/–**	**66/–**	
To deliver	25	25	50	100 cm^3	
Subdivided in	0·1	0·05	0·1	0·2 cm^3	
Dozen	**590/–**	**720/–**	**660/–**	**720/–**	a
Each	**53/–**	**66/–**	**59/–**	**65/–**	

BW-088

BURETTES, *Technico,* **BST stamped Class A,** with **interchangeable straight bore stopcock,** with BST certificate giving values at 5 test points. The sizes marked * are fitted with an enlarged tube at the top for easy filling. **Borosilicate glass.**

To deliver	1*	2*	5*	10* cm^3	
Subdivided in	0·01	0·02	0·05	0·02 cm^3	
Each	**165/–**	**165/–**	**166/–**	**175/–**	a
To deliver	25	25	50	100 cm^3	
Subdivided in	0·1	0·05	0·1	0·2 cm^3	
Each	**165/–**	**175/–**	**169/–**	**174/–**	a

All items on this page normally available from stock.

Technico
REGD. TRADE MARK

BURETTES WITH DOUBLE OBLIQUE BORE STOPCOCK

BW-134

BURETTES, *Technico,* **Class B,** with double oblique bore stopcock. The sizes marked * are fitted with an enlarged tube at the top.

To deliver	1*	2*	5*	10	10* cm^3	
Subdivided in	0·01	0·02	0·05	0·1	0·02 cm^3	
Dozen	**240/–**	**240/–**	**250/–**	**210/–**	**310/–**	*a*
Each	**22/–**	**22/–**	**23/–**	**19/–**	**28/–**	

To deliver	25	25	50	100 cm^3	
Subdivided in	0·1	0·05	0·1	0·2 cm^3	
Dozen	**225/–**	**320/–**	**240/–**	**290/–**	*a*
Each	**20/6**	**29/–**	**22/–**	**26/6**	

BW-136

BURETTES, *Technico,* **Class A,** with double oblique bore stopcock. The sizes marked * are fitted with an enlarged tube at the top. **Borosilicate glass.**

To deliver	1*	2*	5*	10* cm^3	
Subdivided in	0·01	0·02	0·05	0·02 cm^3	
Dozen	**510/–**	**510/–**	**520/–**	**660/–**	*a*
Each	**46/–**	**46/–**	**47/–**	**60/–**	
To deliver	25	25	50	100 cm^3	
Subdivided in	0·1	0·05	0·1	0·2 cm^3	
Dozen	**510/–**	**660/–**	**570/–**	**640/–**	*a*
Each	**47/–**	**60/–**	**52/–**	**58/–**	

BW-137

BURETTES, *Technico,* **Class A,** with double oblique bore stopcock with **works certificate** giving values at 5 test points. The sizes marked * are fitted with an enlarged tube at the top for easy filling. **Borosilicate glass.**

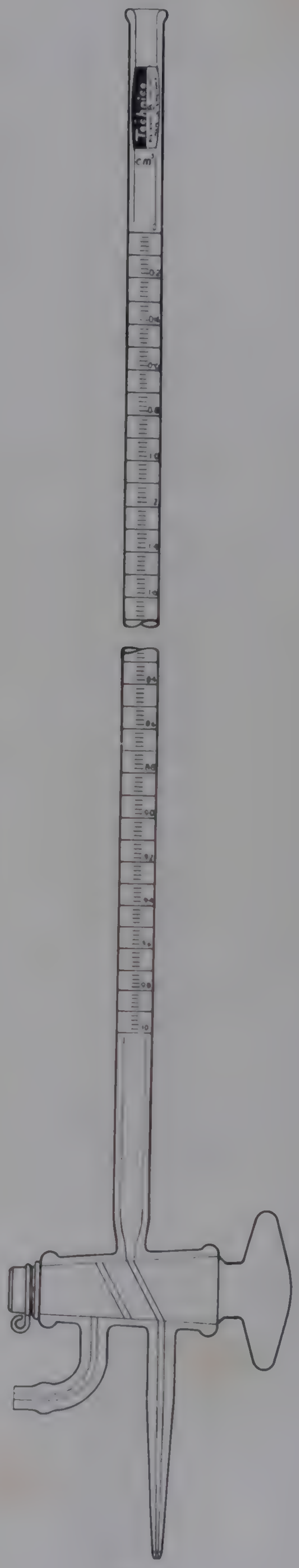
To deliver	1*	2*	5*	10* cm^3	
Subdivided in	0·01	0·02	0·05	0·02 cm^3	
Dozen	**660/–**	**660/–**	**680/–**	**820/–**	*a*
Each	**60/–**	**60/–**	**62/–**	**75/–**	
To deliver	25	25	50	100 cm^3	
Subdivided in	0·1	0·05	0·1	0·2 cm^3	
Dozen	**680/–**	**820/–**	**740/–**	**820/–**	*a*
Each	**62/–**	**75/–**	**67/–**	**73/–**	

BW-138

BURETTES, *Technico,* **BST stamped Class A,** with double oblique bore stopcock with BST certificate giving values at 5 test points. The sizes marked * are fitted with an enlarged tube at the top for easy filling. **Borosilicate glass.**

To deliver	1*	2*	5*	10* cm^3	
Subdivided in	0·01	0·02	0·05	0·02 cm^3	
Each	**170/–**	**170/–**	**172/–**	**183/–**	*a*
To deliver	25	25	50	100 cm^3	
Subdivided in	0·1	0·05	0·1	0·2 cm^3	
Each	**172/–**	**183/–**	**176/–**	**181/–**	*a*

ST-650 Spare retaining springs, see entry in List No. sequence.



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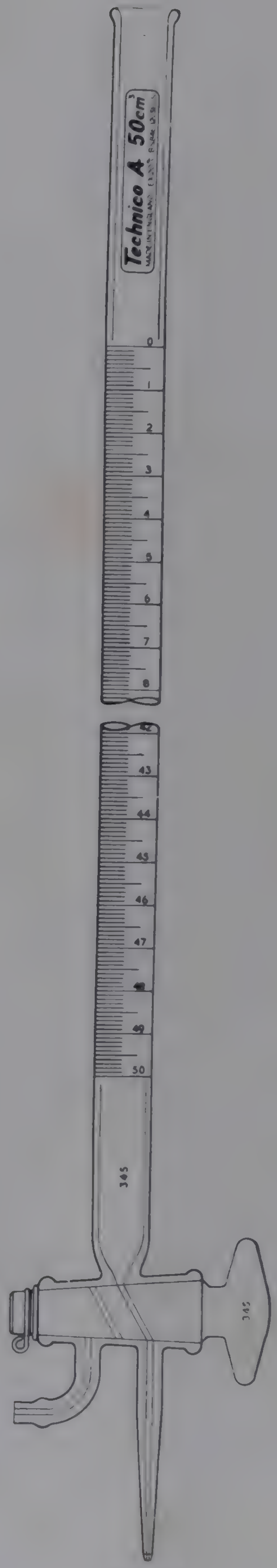

BW-136
BW-137
BW-138

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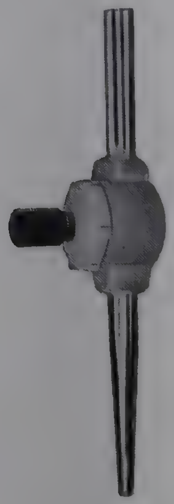
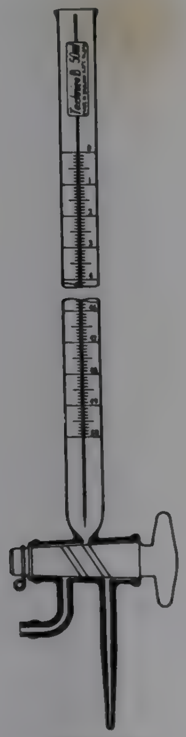
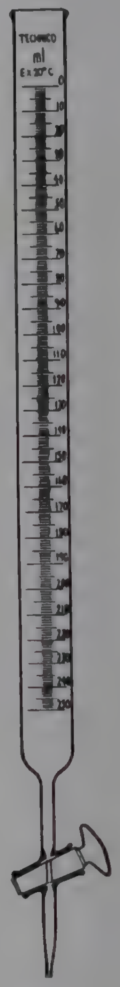


Stopcock of BW-184



BW-294



BW-334

specification see opposite page

BW-184

BURETTE, *Technico*, **Class B**, with *T & M* plastics stopcock. This burette is recommended for general use where the reagents tend to seize glass stopcocks or dissolve the stopcock lubricant. The burette and an adjusted glass jet have ground cones which are a push fit into either side of the tap. The plastics tap may be dismantled completely for cleaning. It is of the diaphragm type and is supplied with a polythene and neoprene washer, either of which may be used. Capacity 50 cm^3 subdivided in 0·1 cm^3.

Dozen **£10. 0. 0.** Each **£0. 18. 0.** c

REPLACEMENT PARTS

BW-185 **Burette**, with ground taper, spare for BW-184.
Dozen **£7. 5. 0.** Each **£0. 13. 3.** *a*

BW-186 **Burette jet**, with ground taper, spare for BW-184.
Dozen **£0. 16. 6.** Each **£0. 3. 0.** *a*

BW-187 **Burette tap**, polythene, complete with two interchangeable washers.
Dozen **£2. 2. 0.** Each **£0. 4. 11.** *f*

Technico

AMBER GLASS BURETTES

BW-224

BURETTES, *Technico*, **Class B**, of low-actinic amber stained glass, with straight bore stopcock.

To deliver	10	25	50 cm^3	
Subdivided in	0·02	0·05	0·1 cm^3	
Dozen	**410/–**	**410/–**	**285/–**	*a*
Each	**37/–**	**37/–**	**26/–**	

Technico

SCHELLBACH BLUE LINE BURETTES

BW-284

BURETTES, *Technico*, **Class B**, with Schellbach blue and white enamel back, with straight bore stopcock.

To deliver	25	50 cm^3	
Subdivided in	0·1	0·1 cm^3	
Dozen	**210/–**	**240/–**	*a*
Each	**19/–**	**22/–**	

BW-294

BURETTES, *Technico*, **Class B**, with Schellbach blue and white enamel back, with double oblique bore stopcock.

To deliver	25	50 cm^3	
Subdivided in	0·1	0·1 cm^3	
Dozen	**285/–**	**310/–**	*a*
Each	**26/–**	**28/–**	

BW-304

BURETTE, *Technico*, **Class B**, with Schellbach blue and white enamel back, with double oblique bore stopcock and automatic zero. To deliver 50 cm^3, subdivided 0·1 cm^3 ... ... Each **£2. 12. 0.** *a*

PYREX BRAND BURETTES

BW-314

BURETTES, *Pyrex brand* glass, **Class B**, with straight bore stopcock.

To deliver	5	10	10	25	50 cm^3	
Subdivided in	0·02	0·02	0·1	0·05	0·1 cm^3	
Std. pack qty.	2	2	2	2	2	
Std. pack	**43/–**	**48/–**	**42/–**	**53/–**	**47/–**	*d*
Each	**24/1**	**26/11**	**23/7**	**29/4**	**26/–**	

BW-316

BURETTES, *Pyrex brand* glass, **Class A**, with straight bore stopcock, and one-point test certificate.

To deliver	10	50 cm^3	
Subdivided in	0·02	0·1 cm^3	
Std. pack qty.	2	2	
Std. pack	**92/–**	**107/–**	*d*
Each	**51/1**	**59/8**	

Technico BURETTES

In addition to meeting the requirements of BS 846, *Technico* burettes embody many refinements and features of design—as shown on pages 88 and 89.

Useful information on burettes and other items of volumetric glassware with regard to methods of use, accuracy, cleaning and other matters will be found under the title VOLUMETRIC GLASSWARE.

All items on this page normally available from stock.

Technico BURETTES

REGD. TRADE MARK

DISPENSING BURETTES

BW-334

BURETTES, dispensing, *Technico,* **Class B,** with straight bore stopcock.

To deliver	250	500	1000 cm^3	
Subdivided in	1	5	10 cm^3	
Dozen	**390/–**	**450/–**	**860/–**	a
Each	**36/–**	**41/–**	**78/–**	

See illustration on page 92.

BULB BURETTES

to BS 846, Part 2

BW-446

BURETTES, bulb, *Technico,* **Class A,** made to BS 846, Part 2, with straight bore stopcock. **Borosilicate glass.**

Total capacity	45	65	85	105 cm^3	
Bulb capacity	20	40	60	80 cm^3	
Scale range	25	25	25	25 cm^3	
Subdivided in	0·05	0·05	0·05	0·05 cm^3	
Dozen	**860/–**	**860/–**	**860/–**	**860/–**	a
Each	**78/–**	**78/–**	**78/–**	**78/–**	

BW-456

BURETTES, bulb, *Technico,* **Class A,** made to BS 846, Part 2, with double oblique bore stopcock. **Borosilicate glass.** Range and subdivision as BW-446.

Total capacity	45	65	85	105 cm^3	
Dozen	**920/–**	**920/–**	**920/–**	**920/–**	a
Each	**84/–**	**84/–**	**84/–**	**84/–**	

BURETTES

with automatic zero

BW-524

BURETTES, *Technico,* **Class B,** with automatic zero and double oblique bore stopcock.

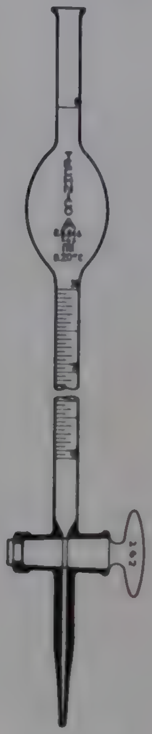
To deliver	25	50	100 cm^3	
Subdivided in	0·1	0·1	0·2 cm^3	
Dozen	**360/–**	**350/–**	**460/–**	a
Each	**33/–**	**32/–**	**42/–**	

For similar burettes in Schellbach see BW-304.

BW-544

BURETTES, *Technico,* **Class B,** concentric tube pattern with automatic zero and nipple connection. For use on a reservoir bottle.

To deliver	10	20 cm^3	
Subdivided in	0·1	0·1 cm^3	
Dozen	**135/–**	**140/–**	a
Each	**12/3**	**12/9**	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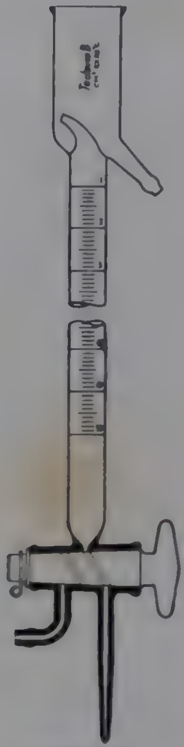
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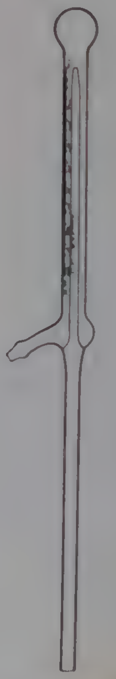
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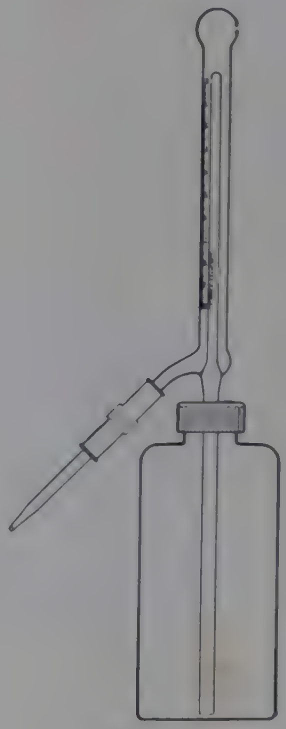

BW-554

BW-554

BURETTES, *Technico,* **Class B,** concentric tube pattern BW-544, fitted to polythene bottle, complete with glass jet and valve BW-840. This assembly does not require a blowball as the burette is refilled by squeezing the bottle.

Burette capacity	10	20 cm^3	
Subdivided in	0·1	0·1 cm^3	
Bottle capacity	600	1200 ml	
Dozen	**320/–**	**370/–**	b
Each	**29/–**	**34/–**	

All items on this page normally available from stock.

Technico

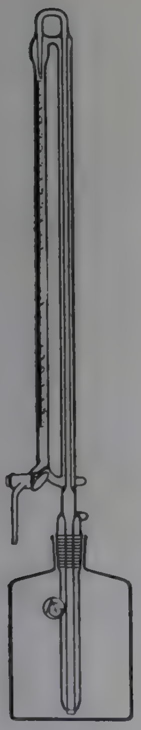
REGD. TRADE MARK

AUTOMATIC BURETTES

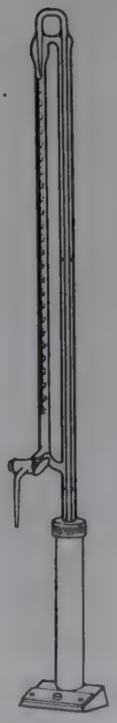
BW-584

BURETTES, *Technico,* **Class B,** with automatic zero. The burette is of very robust design, using a coaxial filling tube system for either suction or pressure operation. The low volume of the system results in particularly fast filling when suction is used. With either suction or pressure control, filling is achieved when a small vent is closed with the fingertip. For use with a protective atmosphere, suction operation must be used, and facility is provided for attachment of a suitable guard tube (e.g. AB-600). Complete with reservoir bottle BW-655.

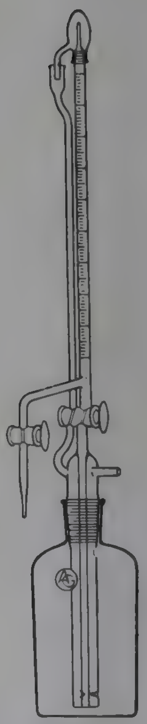
To deliver	10	25	50 cm^3	
Subdivided	0·05	0·1	0·1 cm^3	
Reservoir	500	2000	2000 ml	
Joint size	24/29	29/32	29/32	
Each	**125/–**	**125/–**	**125/–**	*a*



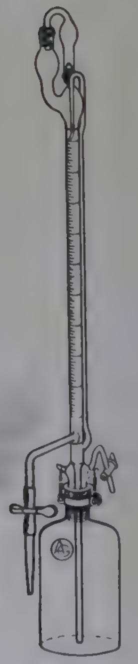
BW-584



BW-594



BW-634



BW-644

BW-594

BURETTES, *Technico,* **Class B,** with automatic zero, for titration bench mounting. The filling system is of a robust coaxial design for suction operation. The burette is supplied complete with a special foot which also houses a label plate and press button valve. It fills rapidly when the valve is pressed and on release the zero level is automatically established. A suitable reservoir has to be installed below the bench and a small suction pump may be used for filling as many as six burettes. Supplied complete with mounting foot, T-piece and connector.

To deliver	10	25	50 cm^3	
Subdivided	0·05	0·1	0·1 cm^3	
Each	**197/6**	**197/6**	**197/6**	*a*

REPLACEMENTS AND ACCESSORY

		To deliver	10	25	50 cm^3	
BW-600	**Burette**	Each	**108/–**	**108/–**	**108/–**	*a*
BW-602	**T-piece**	... ...			Each **£0. 4. 9.**	*a*
AF-414	**Air pump.**	For details see entry in List No. sequence.				

BW-634

BURETTES, micro, *Technico,* **Class B,** fully automatic. This design obviates the necessity of a hand or automatic release valve by using a special filling stopcock. When filling is completed the stopcock is reversed and automatically releases the pressure in the reservoir and returns the overflow. A separate stopcock is used for operating the burette. This design is one of very few on the market for fully automatic operation on a micro-burette, and the zero arrangement is independent of surface tension. Fitted on a 500 ml reservoir bottle BW-655.

To deliver	2	5 cm^3	
Subdivided in	0·01	0·02 cm^3	
Each	**145/–**	**155/–**	*a*

BW-644

BURETTES, *Technico,* **Class B,** automatic, to BS 1428, Part D1, with automatic zero adjustment and fitted to 500 ml reservoir bottle BW-655. The burette and reservoir bottle are made of borosilicate glass, as recommended by Pregl. Complete with metal clip fittings for securing the burette into the neck of the bottle, two moisture guard tubes, jet for pinchclip, and one pair of springs JR-140 size 38 mm.

To deliver	5	10	25 cm^3	
Subdivided in	0·02	0·05	0·1 cm^3	
Each	**125/–**	**125/–**	**125/–**	*a*

BW-646

BURETTES, *Technico,* **Class A,** automatic, as BW-644, but fitted with stopcocks in place of pinchclips.

To deliver	5	10	25 cm^3	
Subdivided in	0·02	0·05	0·1 cm^3	
Each	**155/–**	**155/–**	**155/–**	*a*

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Technico BURETTES

REGD. TRADE MARK

BW-647

BURETTES, *Technico,* **Class A,** as BW-646, with **works certificate** giving values at 5 test points.

To deliver	5	10	25 cm^3	
Subdivided in	0·02	0·05	0·1 cm^3	
Each	**185/–**	**185/–**	**185/–**	*a*

BW-655

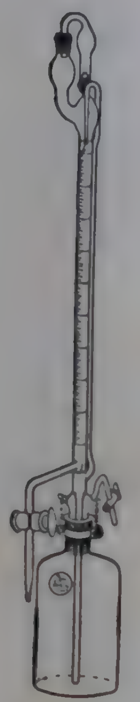
RESERVOIR BOTTLES, replacement for automatic burettes BW-584, BW-634, BW-644, BW-646, and BW-647. Wide stable pattern with standard joint neck, borosilicate glass.

Capacity	500	2000 ml	
Socket	24/29	29/32	
Dozen	**155/–**	**220/–**	*a*
Each	**14/–**	**20/–**	

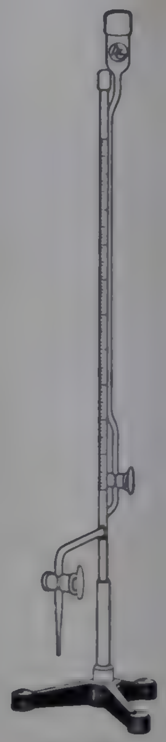
BW-754

BURETTES, micro, *Technico,* **Class B,** mounted on tripod base with filling funnel offset so that the burette tube is free for cleaning. Burette tube and filling funnel fitted with glass caps.

To deliver	2	5 cm^3	
Subdivided in	0·01	0·02 cm^3	
Each	**98/–**	**98/–**	*a*



BW-646
BW-647



BW-754

CONWAY MICRO BURETTE

BURETTE, micro, Conway pattern, *Technico,* **Class A,** to deliver 0·25 cm^3, subdivided in 0·001 cm^3, and capable of being read to 0·00025 cm^3, the graduated tube being a length of precision bore tubing. The graduated burette tube is connected by plastics tubing to the remaining glass parts which are of borosilicate glass. Owing to the design of the burette and the relative capacities of burette tube and connecting tubes, the liquid which is delivered from the jet has been in contact only with borosilicate glass. The reservoir bottle is fitted with a guard tube. A ball and socket ground joint is fitted between the reservoir delivery tube and the burette stopcock tube to simplify cleaning, and minimise breakage. The burette is mounted on a wooden stand with white technolite base and a white background to the burette tube which enables accurate readings to be taken. The stand has an adjustable support for the reservoir bottle and an adjustable table under the delivery jet to take a Conway unit or a micro beaker. A full description of the burette and its method of operation is given in 'Microdiffusion Analysis and Volumetric Error' by Edward J. Conway, F.R.S., M.B., D.Sc., Professor of Biochemistry, University College, Dublin.

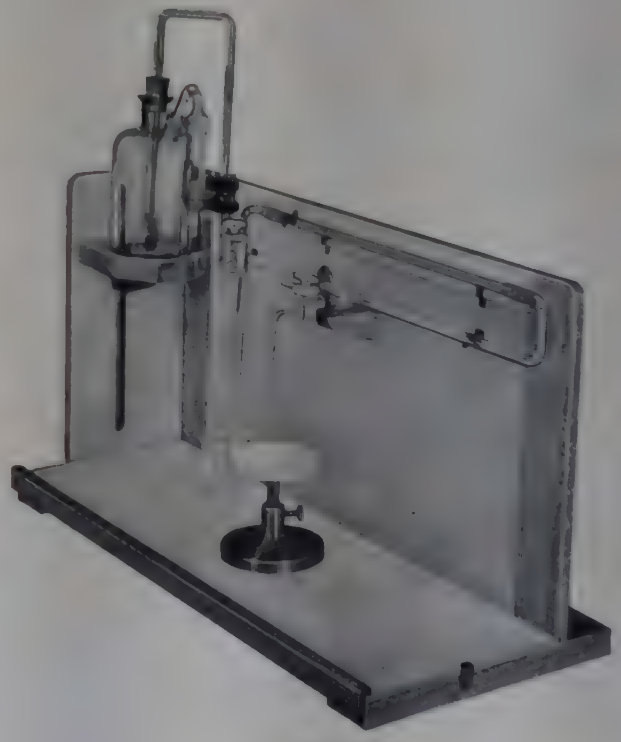
BW-786

BURETTE, micro, Conway pattern, as above specification ... ... Each **£20.16. 6.** *a*

REPLACEMENT PARTS

BW-787	**Burette tube,** graduated	Each **£1.15. 0.**	*a*
BW-788	**Main connecting tube,** with 2 stopcocks and ball and socket joint	Each **£3. 2. 0.**	*a*
BW-789	**Reservoir delivery tube,** with ball joint.	Each **£0.16. 6.**	*a*
BW-790	**Pressure balancing tube,** with stopcock, borosilicate glass	Each **£1. 2. 0.**	*a*
BW-791	**Reservoir bottle,** with 2 necks...	Each **£1. 5. 0.**	*a*
BW-792	**Moisture guard tube**	Each **£0. 9. 3.**	*a*

Conway units for use with BW-786, see MD-120 et seq. in **MEDICAL SCIENCES.**



BW-786

BURETTES,

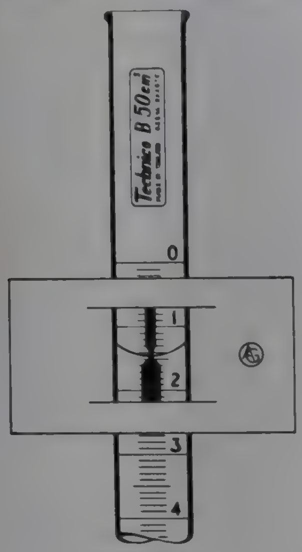
Gas	see GAS ANALYSIS
Hempel	see GAS ANALYSIS
Martins	see CARBON DIOXIDE APPARATUS
Tutweiler	see GAS ANALYSIS

All items on this page normally available from stock.

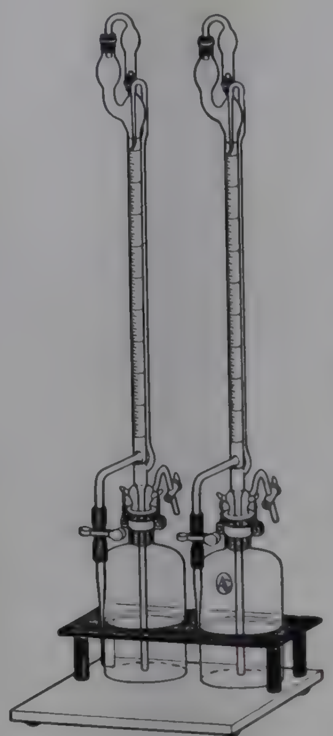
BW-840

BW-850

BW-860



BW-870



2 × BW-644 in BW-881

BURETTE ACCESSORIES

BW-840
BURETTE VALVE, Ⓐ, **nitrile rubber,** for nipple ended burettes. Precise regulation of titrant flow is effected by applying thumb and forefinger pressure between ridges. Dimensions: 65 mm long with 5 mm bore for fitting burette and jet. Without jet.
Dozen packs **£5. 18. 0.** Pack of 5 **£0. 10. 9.** *b*

ACCESSORY
BW-050 Burette jets, glass. For price see entry in List No. sequence.

BW-850
BURETTE CAP, glass, 24 mm dia. × 30 mm long.
Pack of 12 **£0. 8. 3.** *a*

BW-860
BURETTE FLOAT, for use with opaque solution. The top sphere carries a graduation line which remains above the surface of the liquid when in use. Diameter suitable for use in 50 cm³ burettes.
Dozen **£4. 14. 0.** Each **£0. 8. 9.** *a*

BW-870
BURETTE READER, white cardboard with an intense blue line down the middle, made with two slots to slip over any burette as shown in the illustration. The white card can also be used for recording burette readings, if desired.
In std. pack containing 12 cards. Dozen packs **£1. 13. 0.** *c*
Pack **£0. 4. 3.**

TJ-905
BURETTE/THERMOMETER READER, see entry in List No. sequence.

BW-880
BURETTE STAND, consisting of heavy white technolite base with black plastics support for reservoir bottle, mounted on rubber feet. To fit 500 ml bottle. Suitable for burettes BW-634, BW-644, BW-646 and BW-647.
Each **£2. 2. 0.** *b*

BW-881
BURETTE STAND, as BW-880, but to take 2 burettes.
Each **£2. 15. 0.** *b*

BURETTE STANDS, see also SM-210, SM-212, SM-230, SM-242, SM-260, SM-290 in List No. sequence.

BURNERS
SELECTION CHART

	Town (coal) gas	Natural (methane) gas	LPG†	Petrol/ air gas
Bunsen	BX-020 BX-030 BX-035 BX-040	BX-220 BX-230 BX-035 BX-240	BX-420 BX-425 (Amal) BX-430 BX-035	BX-720 BX-730
Meker	BX-045 BX-054 (Amal) BX-060 (Amal)	BX-245 BX-254 (Amal) BX-260 (Amal)	BX-445 BX-447 (Amal) BX-454 (Amal) BX-460 (Amal) BX-465 (Amal) BX-470	
Teclu	BX-075	BX-275		
Fishtail	BX-077	BX-277		
Micro	BX-085 BX-095	BX-285	BX-485	BX-735
Ring	BX-105		BX-505	
Bar	BX-115			
Amal				
Corporal			BX-425 BX-447	
Minor	BX-054	BX-254	BX-454	
Major	BX-060	BX-260	BX-460	
Maximus			BX-465	

† Liquified petroleum gas.

ASBESTOS BOARD see AR-470 *et seq.*
BLOWPIPES see BR-150 *et seq.*
GAUZES see GK-100 *et seq.*
TRIANGLES see TV-540 *et seq.*
TRIPODS see SM-910 *et seq.*

All items on this page normally available from stock.

Burners of all types are listed, according to the nature of gas to be used, under the following sub-headings:

- TOWN (COAL) GAS
- NATURAL (METHANE) GAS
- LIQUIFIED PETROLEUM GAS
- PETROL/AIR GAS.
- LIQUID FUEL.

TOWN (COAL) GAS BURNERS

BX-020

BURNERS, Bunsen, for **coal gas,** fitted with air regulator.

Tube dia.	11	13 mm	
Dozen	**68/–**	**74/–**	c
Each	**6/10**	**7/4**	

BX-030

BURNER, Bunsen, for **coal gas,** with 13 mm dia. burner tube, air regulator, and by-pass tube for relighting.
Dozen **£18. 0. 0.** Each **£1. 13. 0.** c

BX-020

BX-030

BX-035

BURNER, Bunsen, 'All Gases' for use with **coal gas, methane, butane, propane** or mixtures of these gases. With adjustable jet, air regulator, fine adjustment valve and variable baffle. Overall height 15 cm.
Dozen **£12. 5. 0.** Each **£1. 2. 6.** c

BX-040

BURNER, Bunsen, pipeline, for **coal gas,** with 11 mm dia. burner tube threaded $\frac{1}{8}$ in BSP for screwing into gas supply lines, air regulator and stopcock.
Dozen **£10. 10. 0.** Each **£0. 19. 0.** c

BX-035

BX-040

BX-045

BURNERS, Meker, for **coal gas,** with refractory disk to produce a stable high temperature flame.

Flame dia.	20	25 mm	
Dozen	**350/–**	**420/–**	c
Each	**32/–**	**38/–**	

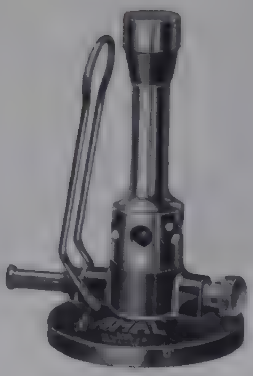
BX-054

BURNER, Meker type, *Amal* **Minor,** for **coal gas,** with adjustable needle valve. Head dia. 25 mm.
Each **£2. 7. 3.** *m*

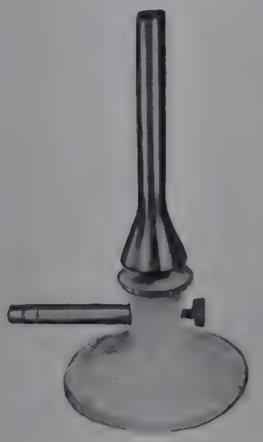
BX-060

BURNER, Meker type, *Amal* **Major,** for **coal gas,** with adjustable needle valve. Head dia. 43 mm.
Each **£2. 18. 3.** *m*

BX-045


BX-054
BX-060

All items on this page normally available from stock.



BX-075

BX-077

BX-085

BX-105

BX-095

FLETCHER, RUSSELL & Co LTD

BX-115

TOWN (COAL) GAS BURNERS
(continued)

BX-075

BURNER, Teclu, for coal gas, with 13 mm dia. burner tube, air regulator and gas control needle valve.
Dozen **£9. 5. 0.** Each **£0. 17. 0.** c

BX-077

BURNER, fishtail benchlight, for **coal gas,** 25 cm high. Suitable for working small diameter soda glass tubing. Dozen **£3. 18. 0.** Each **£0. 7. 8.** c

BX-085

BURNER, micro, for **coal gas,** with 5 mm dia. burner tube and air regulator.
Dozen **£5. 4. 0.** Each **£0. 9. 6.** c

BX-095

BURNER, micro, for **coal gas,** with air and gas regulators. The burner jet position is adjustable, and the burner height can be set from bench level up to maximum of 15 cm ... ... Each **£3. 10. 0.** c

BX-105

BURNER, ring, for coal gas. Mounted on vitreous enamelled heat deflecting base. With air and gas regulators. Overall dimensions 30×21×8 cm high.
Each **£1. 17. 6.** c

BX-115

BURNERS, bar, for **coal gas,** with air and gas regulators.

Length of flame	35	60 cm	
Each	**19/9**	**50/3**	m

BX-220

BX-230

BX-240

NATURAL (METHANE) GAS BURNERS

BX-220

BURNERS, Bunsen, for **methane,** fitted with air regulator.

Tube dia.	11	13 mm	
Dozen Each	**112/–** **10/3**	**125/–** **11/3**	c

BX-230

BURNER, Bunsen, for **methane,** with 13 mm dia. burner tube, air regulator and by-pass tube for relighting.
Dozen **£24. 0. 0.** Each **£2. 4. 0.** c

BX-035

BURNER, Bunsen, 'All Gases'. See entry in List No. sequence.

BX-240

BURNER, Bunsen, pipeline, for methane. With 11 mm dia. burner tube threaded ⅛ in BSP for screwing into gas supply lines, air regulator and stopcock.
Dozen **£12. 0. 0.** Each **£1. 2. 0.** c

All items on this page normally available from stock.

NATURAL (METHANE) GAS BURNERS
(continued)

BX-245

BURNERS, Meker, for **methane.** With refractory disk to produce a stable high temperature flame. Flame dia. 25 mm ... ... Dozen **£21. 0. 0.** Each **£1.18. 0.** c

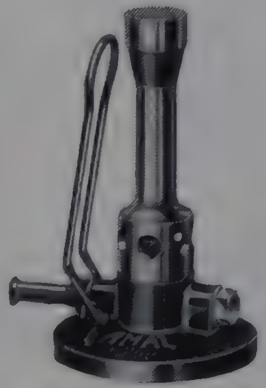
BX-254

BURNER, Meker type, *Amal* **Minor,** for **methane** at 6 in W.G. With fixed No. 75 jet and one each Nos. 70, 80 and 85 jets. Head diameter 25 mm.
Each **£2. 5. 0.** *m*

BX-260

BURNER, Meker type, *Amal* **Major,** for **methane** at 6 in W.G. With fixed No. 200 jet and one each Nos. 160, 180 and 220 jet. Head diameter 43 mm.
Each **£2.15. 6.** *m*

BX-245


BX-254
BX-260

BX-275

BURNER, Teclu, for **methane** with 13 mm dia. burner tube, air regulator and gas control needle valve.
Dozen **£12. 0. 0.** Each **£1. 2. 0.** c

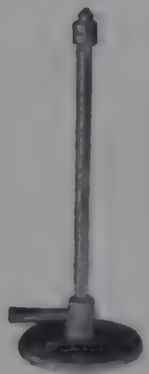
BX-277

BURNER, fishtail benchlight, for **methane,** 25 cm high. Suitable for working small diameter soda glass tubing. Dozen **£6. 5. 0.** Each **£0.11. 3.** c

BX-285

BURNER, micro, for **methane.** With 5 mm dia. burner tube and air regulator.
Dozen **£7.10. 0.** Each **£0.13. 6.** c

BX-275


BX-277

BX-285

LIQUIFIED PETROLEUM GAS (LPG) BURNERS

BX-420

BURNERS, Bunsen, for **butane** at 11 in W.G. and **propane** at 13 to 14 in W.G. With air regulator.

Tube dia.	11	13 mm	
Dozen	**112/–**	**125/–**	c
Each	**10/3**	**11/3**	

BX-425

BURNER, Bunsen type, *Amal* **Corporal,** for **butane** and **propane** at approx. 11 in W.G. Each **£0. 6. 9.** *m*

BX-430

BURNER, Bunsen, for **butane** at 11 in W.G. and **propane** at 13 to 14 in W.G. With 13 mm dia. burner tube, air regulator and by-pass tube for relighting.
Dozen **£24. 0. 0.** Each **£2. 4. 0.** c

BX-035

BURNER, Bunsen, 'All Gases'. See entry in List No. sequence.

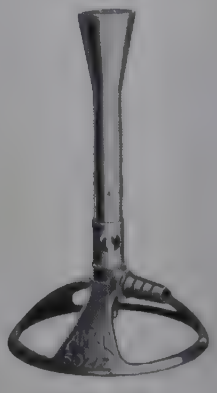
BX-120

BX-125

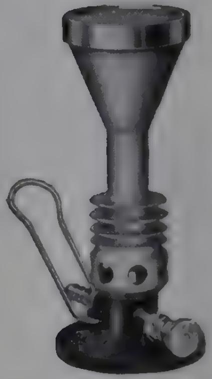
BX-430

All items on this page normally available from stock.

BX-445

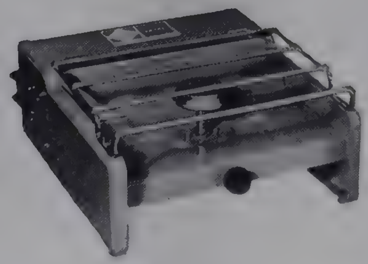

BX-447

BX-454
BX-460


BX-465

BX-470 with BX-472

BX-485


BX-505

LIQUIFIED PETROLEUM GAS (LPG) BURNERS

(continued)

BX-445

BURNERS, Meker, for **butane** at 11 in W.G. and **propane** at 13 to 14 in W.G. With refractory disk to produce a stable high temperature flame.

Flame dia.	20	25 mm	
Dozen	**350/–**	**420/–**	*c*
Each	**32/–**	**38/–**	

BX-447

BURNER, Meker type, *Amal* **Corporal,** for **butane** and **propane** at approx. 11 in W.G. Each **£0. 11. 3.** *m*

BX-454

BURNER, Meker type, *Amal* **Minor** for **butane** and **propane** at approx. 11 in W.G. With fixed No. 25 jet and one each No.'s 20, 30 and 35 jets. Head diameter 25 mm ... ... Each **£2. 7. 3.** *m*

BX-460

BURNER, Meker type, *Amal* **Major** for **butane** and **propane** at approx. 11 in W.G. With fixed No. 40 jet and one each No.'s 30, 50 and 60 jets. Head diameter 43 mm ... ... Each **£2. 18. 3.** *m*

BX-465

BURNER, Meker type, *Amal* **Maximus,** for **butane** and **propane** at approx. 11 in W.G. Designed to give an equivalent amount of heat as the Amal Major BX-060 burning coal gas. With three fixed No. 50 jets and needle valve. Head diameter 60 mm ... Each **£6. 17. 3.** *m*

***BX-470**

BURNER, Meker type, *Labogaz,* for use with expendable **butane** cartridge. Provides flame temperatures up to 1100°C and consumes approx. 60 g/hour at full flame. Overall height 19 cm, flame diameter 20 mm. Complete with air and flame adjustment valves and clip to hold cartridge, but **supplied without cartridge.**
Each **£2. 5. 6.** *m*

ACCESSORY

***BX-472**	**Butane cartridge,** 10 cm high × 9 cm dia., containing 200 g of butane	Pack of 36	**£9. 5. 0.**	*m*
		Pack of 6	**£1. 13. 0.**	

BX-485

BURNER, micro, for **butane** at 11 in W.G. and **propane** at 13 to 14 in W.G. With 5 mm dia. burner tube and air regulator.
Dozen **£7. 10. 0.** Each **£0. 13. 6.** *c*

***BX-505**

BURNER, ring, *Camping Gaz* **'Lotus'.** The modern styled case holds two 200 g butane cartridges, one of which is in reserve, held securely by a catch lever which automatically punctures the service cartridge. Gas from the cartridge fills a vapourising chamber and then passes via a front control needle valve to a 5 cm dia. burner head. Flat bottomed containers can be placed on the grid which clips off for cleaning purposes. The air inlet to the burner requires no setting. Consumption approx. 80 g/h at full flame. Overall dimensions 25 × 25 × 13 cm high. Gross weight with filled cartridges approx. 2·5 kg. Supplied with pricker to clean the jet and instructions for use, but **without cartridges** ... ... Each **£6. 12. 6.**

ACCESSORY

BX-472 **Butane cartridge.** See entry in List No. sequence.

All items on this page normally available from stock.

PETROL/AIR GAS BURNERS

BX-720

BURNER, Bunsen, for petrol gas. With adjustable gas injector and air regulator ... Each **£1. 8. 0.** *m*

BX-730

BURNER, Bunsen, for petrol gas. With stopcock, air regulator and adjustable pilot jet for relighting. Each **£3. 10. 0.** *m*

BX-735

BURNER, micro, for petrol gas. With stopcock and air regulator ... ... Each **£1. 5. 6.** *m*

BX-720

BX-730

BX-735

LIQUID FUEL BURNERS

BX-750

BURNERS, for methylated spirit, with porcelain wick holder, wick and ground-on cap to prevent evaporation when not in use.

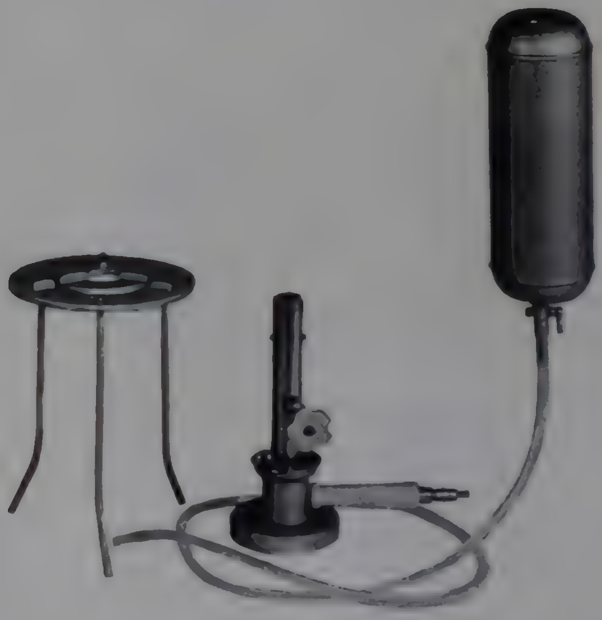
Capacity	60	125 ml	
Dozen	**74/–**	**76/–**	c
Each	**7/4**	**7/6**	

BX-800

BURNER, Bunsen, Barthel type, for use with methylated spirit. Suitable for the Naked Flame Test described in BS 738 and the Spirit Burner Test described in BS 3289, 3497 and 3503. Complete with 1 litre capacity fuel reservoir, 1·5 metres of flexible transparent plastics tubing, tripod with removable centre piece, one each fine and coarse gauzes, pricker and instructions. Each **£10. 15. 0.** c

REPLACEMENT PART

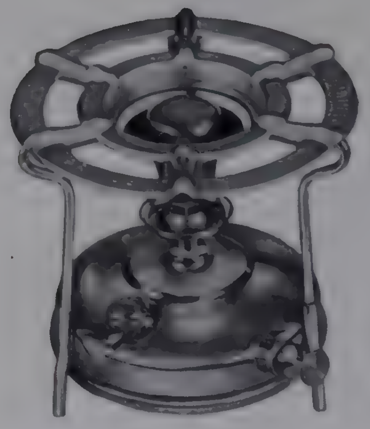
BX-804 **Burner** only.... ... ... Each **£7. 0. 0.** c



BX-800

***BX-860**

BURNER, ring, *Primus* **100/4138,** for **kerosene.** Capacity 1 litre, consumption 250 ml per hour. Complete with prickers ... ... Each **£2. 16. 6.** *m*



BX-860

All items on this page normally available from stock.

USEFUL EQUIVALENTS AND CONVERSION FACTORS

Selected from BS 350 and BS 3763, with abbreviations in accordance with BS 1991, these figures are in accordance with the International System (SI) units and with the U.K. Weights and Measures Act of 1963. Figures shown in bold type are, in accordance with revised definitions, *exact* conversions between metric and Imperial units.

LINEAR MEASURE

Angström unit (Å). 1×10^{-10}m; **3·937**$\times10^{-9}$ in.

Centimetre (cm). **0·3937** in; **0·032 808 4** ft.

Foot (ft). **0·3048** m; 1·8939$\times10^{-4}$ mile.

Inch (in). **0·0254** m; 0·027 778 yd.

Kilometre (km). 0·621 371 mile; 1093·613 yd.

Metre (m). 1×10^{10} Å; **39·37** in; **3·280 84** ft; 1·093 613 yd.

Micrometre (micron) (μm). 1×10^{-6} m; **3·937**$\times10^{-5}$ in.

Mile. **1·609 344** km.

Yard (yd). **0·9144** m; 5·681 82$\times10^{-4}$ mile.

SQUARE MEASURE

Acre. 4,840 yd^2; 43,560 ft^2; 4,046·86 m^2.

Hectare. 1×10^4 m^2; 2·471 05 acres.

Square centimetre (cm^2). 0·155 000 in^2.

Square foot (ft^2). **929·0304** cm^2.

Square inch (in^2). **6·4516** cm^2.

Square metre (m^2). 1·195 992 yd^2; 1550·00 in^2.

Square yard (yd^2). **0·836 127 36** m^2.

CUBIC MEASURE AND CAPACITY

Cubic centimetre (cm^3). 0·061 023 7 in^3; 16·8936 minims; 0·035 195 fl. oz.

Cubic decimetre (dm^3). 61·0237 in^3; 35·195 fl. oz; 1·759 75 pint; 0·219 969 UK gal.

Cubic foot (ft^3). 0·028 316 8 m^3; 6·228 84 gal.

Cubic inch (in^3). **16·387 064** cm^3; 0·576 74 fl. oz.

Cubic metre (m^3). 219·969 gal; 1·307 95 yd^3; 35·3147 ft^3; 61,023·7 in^3.

Fluid drachm (fl. dr). 0·125 fl. oz; 60 mimins; 3·5516 cm^3; 0·216 734 in^3.

Fluid ounce (fl. oz). 8 fl. dr; 480 minims; 28·4130 cm^3; 1·733 87 in^3.

Gallon (UK) (gal). 0·004 546 09 m^3; 160 fl. oz; 277·420 in^3; 0·160 544 ft^3.

Litre The litre was redefined by the Conférence Générale des Poids et Mesures in October 1964 as being a synonym for the cubic decimetre. To avoid confusion with the former equivalent of 1000·028 cm^3 it is recommended that the term litre (together with the subdivisions millilitre and microlitre) should not be associated with measurements of high precision.

Minim. 0·059 194 cm^3; 0·002 083 33 fl. oz.

Pint (pt). 0·125 gal; 20 fl. oz; 568·262 cm^3. 34·6775 in^3.

WEIGHT

Drachm (apoth or troy) (dr). 60 gr; 2·1943 dr (avoir); **3·887 934 6** g.

Dram (avoir) (dr). 27·343 75 gr; 0·455 73 dr (apoth or troy); 1·771 845 g.

Grain (gr). **0·064 798 91** g.

Gramme (g). 15·4324 gr; 0·035 274 0 oz (avoir); 0·032 150 7 oz (troy).

Kilogramme (kg). 2·204 622 6 lb (avoir).

Ounce (oz) (avoir). 0·911 458 oz (troy); 437·5 gr; 28·349 523 g.

Ounce (oz) (apoth or troy). 1·097 14 oz (avoir); 480 gr; 31·103 468 g.

Pound (lb) (avoir). 1·215 28 lb (troy); 16 oz (avoir); 7000 gr; **0·453 592 37** kg.

Pound (lb) (apoth or troy). 0·822 857 lb (avoir); 12 oz (troy); 5,760 gr; 0·373 242 kg.

Ton (t). 2,240 lb (avoir); 1016·047 kg.

Tonne (metric ton). 1,000 kg; 0·984 207 t; 2,204·6226 lb (avoir).

VELOCITY

Centimetre per second (cm/s). **0·032 808 4** ft/s.

Foot per second (ft/s). **0·3048** m/s; 1·097 28 km/hr; 0·681 818 mile/hr.

Kilometre per hour (km/hr). 0·911 344 ft/s; 27·7778 cm/s.

Mile per hour 1·4667 ft/s; **0·447 04** m/s.

PRESSURE

Kilogramme per square centimetre (kg/cm^2). 14·2233 lb/in^2; 0·914 36 t/ft^2.

Pound per square inch (lb/in^2). 0·070 307 kg/cm^2.

Atmosphere (atm). 760 mmHg; 29·9213 inHg; 1,013,250 dyn/cm^2; 1013·25 mb; 1·0332 kg/cm^2; 14·6959 lb/in^2.

Millibar (mb). 10^3 dyn/cm^2; 0·750 062 mmHg; 0·000 986 9 atm.

Torr. 1/760 atm; 1·333 22 mb.

DENSITY

Gramme per cubic centimetre (g/cm^3). 62·4278 lb/ft^3.

Pound per cubic foot (lb/ft^3). 0·016 018 5 g/cm^3.

CALCULATING SLIDE RULES

CA-510
SLIDE RULE, *Unique*, **pocket,** 125 mm. A thin all plastics rule. With A, B, C, D, RC, LL_2, LL_3, S and T scales. Supplied in a sheath-type plastics case with instructions ... ... Each **£0. 13. 6.** *m*

CA-515
SLIDE RULE, *Unique*, 250 mm. A general purpose rule with scales faced in non-fading plastics. Scales A, B, C, D, LL_2, LL_3, S and T. Supplied in durable case with instructions ... ... Each **£0. 17. 0.** *m*

CA-519
SLIDE RULE, *PIC* **Standard, No. P281,** 250 × 50 mm. A precision engraved plastics rule with scales A, C, CF, D, DF, RC, F, cm and inches. Supplied in strong case with instructions ... ... Each **£1. 18. 6.** *m*

CA-521
SLIDE RULE, *PIC* **Student, No. P271,** 250 × 50 mm. A precision engraved plastics rule with scales A, B, C, D, L, LL_2, LL_3, RC, S, ST, T and differential trigonometrical group. Supplied in strong case with instructions. Each **£1. 19. 6.** *m*

CA-531
SLIDE RULE, *PIC* **Standard Log Log, No. P241,** 250 × 50 mm. A precision engraved plastics rule with scales A, B, C, D, L, LL_2, LL_3, F, RC, S, ST, T, cm, inches and differential trigonometrical group. Supplied in strong case with instructions ... ... Each **£3. 12. 6.** *m*

CA-536
SLIDE RULE, *PIC* **Comprehensive Double Face, No. P221,** 250 × 50 mm. A precision engraved plastics rule with scales A, B, C, CF, D, DF, F, L, LL_1, LL_2, LL_3 and three scales of e to corresponding negative powers, RC, RD, S, ST, T, scales of Pythagoras for vector analysis and differential trigonometrical group. Supplied in strong case with instructions ... ... Each **£4. 4. 0.** *m*

There are many other types of UNIQUE and PIC slide rules. Full details on request.

HV-260
SLIDE RULE, for calculations of relative humidity from readings of wet and dry bulb hygrometers. For price and details see entry in List No. sequence.

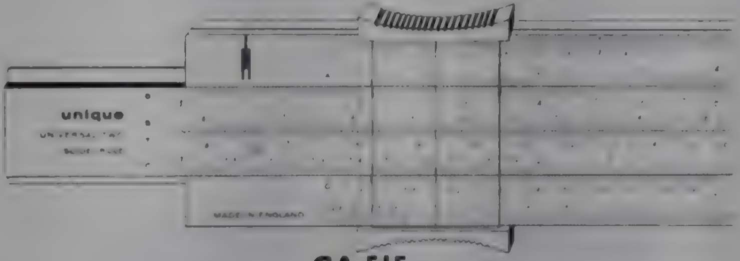
***CA-550**
SLIDE RULE, Nestler Chemists, 250 mm long. A precision comprehensive rule for chemists with scales giving atomic and molecular weights in addition to C, D, L and RC scales. Formulæ of elements and radicals are marked on the face and back of the slide, whilst elements and compounds to be determined are marked on the stock. In addition there is a table of atomic weights and molecular weights of compounds and radicals on the back of the rule. Very useful for rapid calculations connected with analysis and synthesis. Supplied in case with cursor and instructions ... ... Each **£3. 0. 0.** *m*

CA-580
CALCULATOR, Otis King Model K, equivalent to a 168 cm slide rule, consisting of two cylinders, one rotating and sliding within the other, with spiral scales on both and a cursor tube carrying an engraved arrow at each end. Maximum dia. 33 mm, closed length 150 mm, open length 255 mm. Complete in case, with instructions and table of decimal equivalents of parts of one £ and fractions of an inch ... Each **£3. 15. 0.** *m*

CA-590
CALCULATOR, Fuller No. 1, consisting of two cylinders, one rotating and sliding within the other, with a spiral logarithmic scale 1270 cm long on outer cylinder. Two index arms can be moved, simultaneously if so required, to any point. An accuracy of greater than 1 in 10,000 is easily obtainable with practice. Maximum dia. 83 mm, overall length 425 mm. Complete in mahogany case, with instructions ... ... Each **£24. 0. 0.** *m*

The following abbreviations are used to simplify specifications of slide rules:

A — scale of squares on stock; x_D^2
B — scale of squares on slide; x_C^2
C — basic scale on slide; x_C
D — basic scale on stock; x_D
CF — π displaced C scale; πx_C
DF — π displaced D scale; πx_D
F — cubic scale; x^3
L — logarithmic scale; $\log_{10} x$
LL_1 — log-log scale; $e^{0{\cdot}01x}$
LL_2 — log-log scale; $e^{0{\cdot}1x}$
LL_3 — log-log scale; e^x
RC — reciprocal of C scale; $1/x_C$
RD — reciprocal of D scale; $1/x_D$
S — sine and co-sine scale
ST — scale for lower angle range
T — tangent and co-tangent scale



CA-515

CA-536

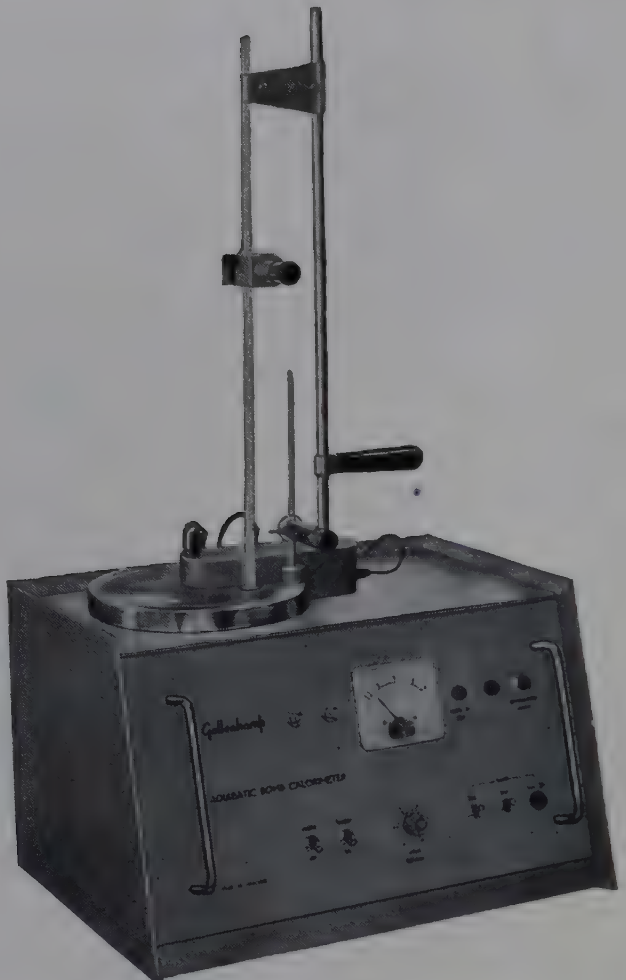
CA-580

CA-590

All items on this page normally available from stock.

Gallenkamp AUTOBOMB

An Automatic Adiabatic Bomb Calorimeter for the rapid and accurate determination of calorific values of



CB-100

- COAL
  - COKE
    - OTHER FUELS
      - PETROLEUM PRODUCTS
        - FOODSTUFFS AND BIOLOGICAL MATERIALS

Suitable for BS 1016, BS 3804, IP 12, ASTM D240, DIN 51708, DIN 51785.

- **Top cover assembly on telescopic lift—no dismantling between tests.**
- **No handling of calorimeter thermometer—risk of breakage negligible.**
- **Instantaneous heaters for accurate response.**
- **High speed water circulation through jacket and cover for temperature uniformity.**
- **Console encloses calorimeter and all control circuits, cables and water connections.**
- **Firing wire continuity tester circuits give visual indication of successful firing.**
- **Swing down control panel for immediate access for servicing.**
- **Printed circuit for reliability.**
- **Includes exclusive illuminated reader/vibrator for thermometer.**

OPERATION

Principle. The automatic adiabatic system employed in the Autobomb prevents exchange of heat between the calorimeter and jacket by ensuring that at every instant throughout the test, the jacket is at the same temperature as the calorimeter vessel which it wholly encloses. Thus, the system eliminates both the tedium of a large number of thermometer readings and the calculation of a cooling correction.

The circuit of the control system is basically simple and therefore reliable. A matched pair of thermistor temperature sensing elements in the jacket and calorimeter vessel respectively form two arms of an a.c. bridge, the other two arms of which are high stability resistors connected by an initial balance rheostat. Out-of-balance signals from the bridge (resulting from the thermistors not being at the same temperature) are amplified by a two-stage printed circuit amplifier and fed to a phase sensitive thyratron. This, via a relay, switches on the heater until the jacket temperature reaches that of the calorimeter. The heater is then switched off until the calorimeter temperature again exceeds that of the jacket.

Operation. The overall design reduces manipulation to a minimum and avoids unsuccessful attempts at firing. Both the determination of the effective heat capacity (cal/°C) of the calorimeter and bomb and the determination of the calorific values (cal/g or BTU/lb) of samples are rapid and accurate.

In outline, the operator fits the bomb cap with firing wire and cotton, then swings into position the crucible containing a known weight (about 1 g) of sample. The bomb is assembled, hand tightened and is then filled with oxygen (normally to 25 atm.) A test circuit is provided for checking at all stages that the firing wire is correctly connected.

The bomb is placed in the calorimeter vessel which has previously been filled with water (about 2 kg) and the jacket lid is lowered to put into position **in one single movement** the calorimeter cover, calorimeter stirrer, thermometers, thermistor assemblies and bomb firing connector. When the connector is pressed home the 'READY TO FIRE' lamp lights.

Having allowed the apparatus to stabilise, the firing switch is depressed and after 8 to 10 minutes the final equilibrium temperature is noted and checked. Preparation for the next test involves merely switching off the heater, raising the jacket lid with its mounted components and swinging it to the rear, and removing the bomb.

Jacket heating. Two electrode heaters provide instantaneous conductivity heating of the water in the jacket and ensure that it is at the same temperature as the calorimeter vessel at all times throughout the test, no matter how rapidly the temperature of the latter may rise. To ensure uniformity of temperature a centrifugal pump circulates the water rapidly through the jacket and cover. The jacket has an overflow tube and an internal coil through which cold water is passed to cool the jacket.

Calorimeter thermometer. This is an expensive item so that its safe mounting on the jacket lid, without the need for removal between tests is particularly important in reducing breakage risks. The illuminated reader/vibrator, which facilitates the taking of accurate thermometer readings, is controlled by a push-button on the front panel.

Gallenkamp AUTOBOMB

(continued)

DESIGN DETAILS

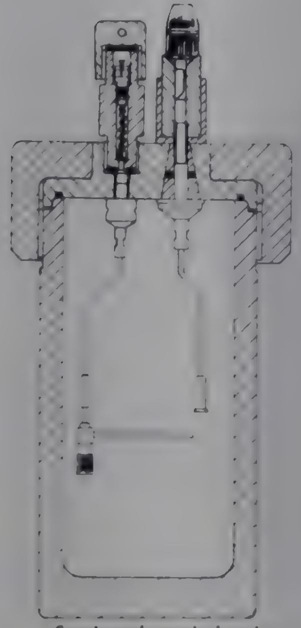
Bomb. The capacity is approximately 300 ml. The body and cap are machined from forged stainless steel bar to BS 1506-845 Grade B. This is a stabilised austenitic steel which has a high corrosion resistance and is not subject to intercrystalline corrosion. The cap is secured by a locking ring machined from rolled aluminium bronze bar. The joint between the body and cap is made by a toroidal sealing ring which enables a perfectly gas-tight seal to be effected by hand tightening only. The oxygen filling point is fitted with a Schrader valve and the union between the bomb and filling tube, sealed by a toroidal sealing ring, is also designed for tightening by hand. Avoidance of the use of tools results in less wear to parts of the bomb. Two stainless steel electrodes are fitted to the cap; one has a ring-shaped support for flanged crucibles and is electrically connected to the cap and the other is insulated by means of a laminated plastics bush.

Every bomb is subjected to a hydraulic pressure test at 4500 lb/in^2 maintained for 10 minutes, and a certificate of test is issued. The certificate gives full details of the mechanical properties and chemical composition of the materials used in the construction of the bomb.

Bomb firing circuit. This circuit is fed from an earthed 8V winding on the mains transformer. It includes a 5A fuse, a test circuit and a lamp which shows when the firing wire has fused. A remote firing switch accessory is available and is easily connected.

Calorimeter vessel. This is made of stainless steel, polished outside. The overall dimensions are approximately 14 cm diameter ×21 cm high and 2 litres of water just cover the bomb. Three metal pegs are fixed inside to support the bomb a sufficient distance from the bottom to allow free circulation of water round the bomb, and a wire lifting handle facilitates assembly into the water jacket.

Console and water jacket. All control circuits are mounted on the swing-down front panel for ease of inspecting and servicing. They comprise an a.c. bridge, printed circuit amplifier, heater relay circuit, bomb 'test', 'ready for firing' and 'fire' systems and all associated switches, fuses indicator lamps and meter.



Section through bomb

CB-200

The jacket and lid are constructed of stainless steel, polished inside.

The calorimeter vessel is located inside the water jacket by a spacer which has the dual purpose of minimising thermal contact between the two and at the same time provides an adequate return path for the bomb firing circuit. The calorimeter is stirred by an independent 250 rev/min motor mounted on the water jacket cover. A heat break in the stirrer shaft prevents conduction of heat to or from the calorimeter.

CB-100

AUTOMATIC ADIABATIC BOMB CALORIMETER, *Gallenkamp* **AUTOBOMB.**

Outfit comprising one each of the following:

CB-110	Calorimeter console (includes thermometer reader/vibrator)
CB-200	Bomb
CB-215	Bomb stand
CB-220	Pressure gauge on stand
CB-225	Bomb filling tube
CB-230	Connecting tube
CB-235	Needle valve
CB-234	2 spanners
CB-351	Pad of report sheets
CB-353	Instructions manual

For 200/250V 50 Hz single phase supplies.
Outfit **£346. 10. 0.** *b*

For 110/130V 50 or 60 Hz single phase supplies.
Outfit **£350. 0. 0.** *bN*

When ordering please state voltage and nature of supply.

Thermometers, crucibles and firing wire are not included in the above outfit because several alternatives are available. Details of these items, together with other accessories and spare parts kits (both CB-115 and CB-203 are recommended) are listed in the next column and on pages 106 and 107.

The following main components, accessories and spare parts are available as separate items:

CB-110

AUTOMATIC ADIABATIC BOMB CALORIMETER, *Gallenkamp* **AUTOBOMB. Console only** comprising calorimeter vessel with stirrer, adiabatic water jacket with heater, circulating pump control circuits, as specification, in an attractively styled outer case, together with a thermometer reader/vibrator. Overall dimensions with cover raised 51·5×40×109 cm high.

Without bomb, thermometers, accessories or spare parts but including instruction manual.

For 200/250V 50 Hz single phase supplies.
Each **£257. 0. 0.** *b*

For 110/130V 50 or 60 Hz single phase supplies.
Each **£260. 10. 0.** *b*V

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

CB-115	**Stand-by spares kit, for CB-110,** comprising one matched pair thermistor elements CB-142, one each electronic valve types 6AM6 and 2D21, three each cartridge fuses 1A, 5A and 10A for 200/250V models (2A, 5A and 15A for 110/130V models) two indicator lamps 14V, two illuminator lamps 6·3V and two gaskets for water pump. Kit **£6. 15. 0.** *b* **When ordering please state voltage.**
CB-141	**Thermistor assemblies,** matched pair. Pair **£14. 5. 0.** *b*
CB-142	**Thermistor elements,** matched pair. Pair **£3. 14. 0.** *b* **When ordering replacement parts, please state serial number of calorimeter and supply voltage.**

Items on this page normally available from stock except those coded *N*.

Gallenkamp AUTOBOMB

(continued)

CB-200

CB-215

CB-220

COMPONENTS AND ACCESSORIES

CB-200

BOMB, *Gallenkamp*, to specification, with works certificate of test ... ... Each **£67. 0. 0.** *b*

CB-202 **B.S.T. certificate of test at 300 atm (4500 lb/in^2).** Each £8. 0. 0. *mN*

REPLACEMENT PARTS

CB-203 **Stand-by spares kit, for CB-200,** comprising two dozen toroidal sealing rings CB-204; 2 packs of five high pressure Schrader valve cores CB-206; one valve housing CB-207; one pair of electrodes with ring support for crucibles of up to 25 mm diameter, sealing ring and set of insulators CB-208; one dozen toroidal sealing rings CB-226; one dozen end ferrules CB-231 and 6 metres of nylon tubing CB-232 for bomb filling tubes ... Kit £15. 3. 0. *b*

CB-204 **Toroidal sealing ring.** Dozen £1. 12. 0. Each £0. 4. 2. *b*

CB-206 **Valve cores, Schrader high pressure type,** supplied in packs containing five ... ... Pack £0. 12. 6. *b*

CB-207 **Valve housing** ... ... Each £1. 3. 0. *b*

CB-208 **Electrodes,** with ring support for crucibles of up to 25 mm dia., sealing ring and set of insulators. Set £8. 0. 0. *b*

ACCESSORIES

CB-210 **Ring support,** for flanged crucibles 38 mm dia. Fits standard electrode ... ... Each £1. 14. 0. *b*

CB-212 **Pressure release valve,** with sidearm for connecting to absorption apparatus. For use when determining nitrogen and sulphur corrections. Pressure in bomb may be released immediately after test thereby saving the usual waiting period for the acid mist to settle. Each £4. 8. 0. *b*

SPARES AND ACCESSORIES FOR AUTOBOMB CALORIMETER

CB-215

STAND, light alloy, for supporting bomb cap when fitting crucible and firing wire ... Each **£3. 2. 0.** *b*

CB-220

PRESSURE GAUGE, on light alloy bench stand, with unions for connecting tubes. The gauge has a 7·5 cm dial calibrated 0-50 atm with a red line at 25, a non-splintering transparent front and two blow-out holes in the rear. Each **£9. 10. 0.** *b*

CB-225

BOMB FILLING TUBE, nylon, 90 cm long, for connecting bomb to pressure gauge stand CB-220. The union to the bomb is tightened by hand, being fitted with a toroidal sealing ring ... ... Each **£2. 0. 0.** *b*

REPLACEMENT PART

CB-226 **Toroidal sealing ring** ... ... Dozen £0. 10. 0. *m*

OTHER ACCESSORIES

A BALANCE is required to determine the weight of water in the calorimeter vessel, capable of weighing a load of about 3 kg to an accuracy of at least 1 g. BA-850 or BC-160 with BC-165 are available.

FLEXIBLE TUBING is required for cooling water and overflow connections at the rear of the calorimeter console. Three pieces are necessary of length to reach the nearest sink. TX-772 size N 6·5 or TX-520 size N 6·5 are suitable alternatives.

Items on this page normally available from stock except those coded *N*.

Gallenkamp AUTOBOMB

(continued)

SPARES AND ACCESSORIES

(continued)

CB-230

CONNECTING TUBE, nylon, 90 cm long, with unions for connecting pressure gauge stand CB-220 to needle valve CB-235 ... ... Each **£1. 3. 6.** *b*

REPLACEMENT PARTS

CB-231	**End ferrule,** for nylon tube ...	Dozen	**£0. 6. 6.**	c
CB-232	**Nylon tube**	Metre	**£0. 2. 6.**	c

ACCESSORY

CB-234	**Spanner,** to fit filling and connecting tube union nuts, size $\frac{7}{16}$ BSW	Each	**£0. 3. 3.**	*m*

CB-235

NEEDLE VALVE, for oxygen cylinder with blow-off valve set to operate at 37·5 atm (gauge) and union to accept connecting tube CB-230 ... Each **£5. 8. 0.** *c*

CALORIMETER THERMOMETERS TO BRITISH STANDARD 791

This specification covers a range of solid stem thermometers, overall length about 750 mm, with maximum error at any point 0·1°C and maximum change in error 0·01°C for any interval of 0·5°C.

TJ-564 et seq.

THERMOMETERS, calorimeter, BS 791.

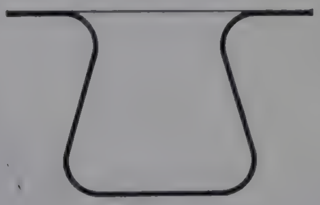
TJ-070

THERMOMETER, for adiabatic water jacket, range −5 to + 50°C in 0·1°C.

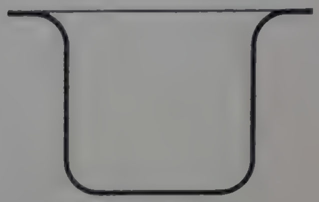
For prices see entries in List No. sequence.

BOMB CRUCIBLES

		Dozen	Each	
CB-260	**Nickel chromium,** 25 mm dia. × 18 mm deep, with flange, for testing coal to BS 1016 Pt. 5.	**£4. 8. 0.**	**£0. 8. 3.**	c
CB-262	As CB-260 but **transparent silica.**	—	**£1. 0. 6.**	*m*
CB-263	As CB-260 but **platinum.**	**Price on application**		*fN*
CB-266	**Nickel chromium,** 38 mm dia. × 17·5 mm deep, with flange, for testing coke to BS 1016 Pt. 5.	**£6. 10. 0.**	**£0. 11. 9.**	c
CB-268	As CB-266 but **transparent silica**	—	**£5. 0. 0.**	*m*
CB-270	As CB-266 but **platinum.**	**Price on application**		*fN*
CB-274	**Nickel chromium,** inward tapering, base 25 mm dia., top 18 mm dia. × 18 mm deep, with flange, for testing high ash and ash ejecting coals. (Use with ring support CB-210).	**£9. 5. 0.**	**£0. 17. 0.**	c
CB-276	**Inconel, Type 1,** base 19 mm dia., top 12·7 mm dia. × 19 mm deep, with flange, for standardisation with benzoic acid and testing fuels with flash points below 100°F to IP 12.	**£17. 10. 0.**	**£1. 12. 0.**	*b*
CB-278	**Inconel, Type 2,** 19 mm dia. × 19 mm deep with flange, for testing fuels with flash points above 100°F to IP 12.	**£6. 10. 0.**	**£0. 11. 9.**	*b*



CB-276



CB-278

CB-280

FIRING WIRE, platinum, 44 swg (approx. 0·08 mm dia.) ... ... Reel approx. 4·5 metres **£1. 12. 0.** *m*

CB-282

FIRING WIRE, nickel chromium, 36 swg (approx. 0·19 mm dia.) Reel approx. 23 metres **£0. 4. 9.** *c*

CB-312

REMOTE FIRING SWITCH UNIT, comprising a biased-off switch mounted in a control box suitable for fixing to bench or wall and fitted with 9 metres of twin core cable ... ... Each **£5. 5. 0.** *b*

CB-320

CAPSULE, gelatine, of stated calorific value, for burning highly volatile liquids.
Gross **£1. 19. 0.** Dozen **£0. 4. 8.** *c*

CB-325

BENZOIC ACID, Thermochemical Standard. In sealed tube containing 100 g ... ... Tube **£1. 13. 0.** *m*

CB-330

FIRING COTTON, 13/14s scoured and bleached, 5–6 mg/cm in balls of about 110 g ... Each **£0. 6. 0.** *c*

CB-340

BRIQUETTE PRESS, for solid fuels with hardened steel punch and die 12·5 mm dia. The press has a screw action and is intended to be bolted to a bench top.
Each **£11. 0. 0.** *b*

CB-351

REPORT SHEETS, for recording observations during calorific value determinations with adiabatic calorimeter, in pads of 100 sheets ... ... Each **£0. 11. 9.** *c*

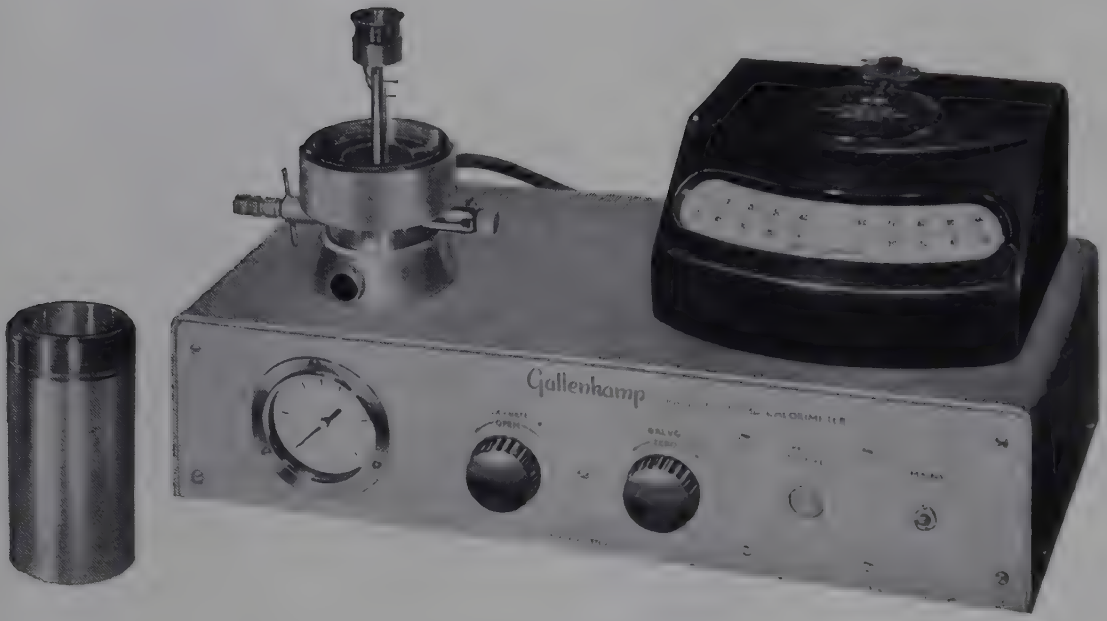
CB-353

INSTRUCTIONS MANUAL for Autobomb CB-100, extra copies ... ... Each **£0. 10. 6.** *b*

Items on this page normally available from stock except those coded *N.*

Gallenkamp BALLISTIC BOMB CALORIMETER

for the rapid determination of calorific values of foodstuffs and faeces in dietetic research and other applications.



- **10 results per hour**
- **No special skill required**
- **Accuracy 1%**
- **Hand sealing bomb, no tools for assembly**

Developed in collaboration with D. S. Miller and P. R. Payne at the Human Nutrition Research Unit of the M.R.C.

REFERENCES

(1) Laboratory Practice, 8, 119 (1959).
(2) *News and Review* No. 2, December 1960.
(3) Fox, Miller and Payne, Proc. Nutr. Soc. 18 ix (1959).
(4) Miller and Payne, Brit. J. Nutr, 12, 501 (1959).

OPERATION

In ascertaining the calorific value of foodstuffs and other non-homogeneous materials, it is frequently difficult to obtain a truly representative single sample. In such cases the average of a number of approximate results can be superior to a single, accurate result from one sample.

The object of the Ballistic Bomb Calorimeter is to enable this to be done with speed. The heat of combustion causes a rapid rise in temperature of the bomb, shown as a 'throw' on the galvanometer spot. It is assumed, as in other ballistic instruments, that the peak galvanometer reading occurs before there is any significant heat loss from the bomb and its contents.

Having established the 'constant correction' (see Bomb firing system below) for the heat dissipated by the firing wire and cotton, the operator has merely to place the sample in the crucible, attach the cotton wicking, screw on the bomb body, fill the bomb with oxygen, press the timed firing button and read the maximum galvanometer deflection. The whole operation takes only a few minutes and calculation of calorific value to 1% accuracy is by simple proportion comparison with a benzoic acid standard.

DESIGN DETAILS

Bomb

The body and base are machined from forged stainless steel bar to BS 1506–845 Grade B. This is a stabilised austenitic steel which is generally recognised as being the most satisfactory for calorimeter bombs. The body is secured to the base by an aluminium bronze locking ring and the joint is sealed by a toroidal ring which enables a gas-tight seal to be effected by hand tightening only. In the base are an oxygen filling point, a gas pressure release needle valve and two sockets for the connection of the electric firing circuit. A pillar to carry the crucible and an insulated electrode are fitted in the base. The firing wire is connected between them.

Oxygen filling system

This consists of a needle valve and a pressure gauge which has a safety glass front and a blowout back. Union fittings are provided for a nylon oxygen supply tube and a nylon bomb filling tube. A hand tightening union nut with a toroidal ring is used to seal the filling tube to the bomb.

Bomb firing system

This consists of a press button operated electric timing switch and a step down transformer. This system applies 2V to the firing wire for sufficient time to raise it to red heat and ignite the sample. The wire is not affected by the firing and can be used repeatedly. The timing switch is of the self resetting type so that the same amount of heat is introduced by the firing system each time the bomb is fired. This results in a constant correction and this simplifies test procedure and the calculation of results.

Temperature measuring system

The temperature reached by the bomb body above the crucible is indicated by a light spot galvanometer connected to a thermocouple which plugs into a shallow hole in the top of the body.

CB-370

BOMB CALORIMETER, BALLISTIC, *Gallenkamp.*

Outfit comprising one each of the following items and full operating instructions.

CB-260	12 Crucibles
CB-325	1 Bottle benzoic acid
CB-330	Cotton wicking
CB-375	Ballistic bomb
CB-376	Firing wire
CB-380	Bomb filling tube
CB-234	2 Spanners
CB-385	Control box
CB-388	Reducing valve
CB-390	Connecting tube
CB-395	Thermocouple
CB-400	Galvanometer

For 200/250V 50 Hz single phase supplies.
Outfit **£220. 0. 0.** *b*

For 110/120V 50 or 60 Hz single phase supplies.
Outfit **£226.10. 0.** *bN*

When ordering please state voltage and nature of supply.

Items on this page normally available from stock except those coded *N.*

Gallenkamp BALLISTIC BOMB CALORIMETER

COMPONENTS AND REPLACEMENTS

CB-373

STAND-BY SPARES KIT for CB-370, comprising one dozen each toroidal sealing rings CB-204 and CB-226, one dozen end ferrules CB-231, two metres nylon tubing CB-232 and one galvanometer lamp CB-401. Kit **£2. 16. 0.** *b*

CB-375

BALLISTIC BOMB, *Gallenkamp,* to specification, with works certificate of test. **Without firing wire.**
Each **£90. 0. 0.** *b*

ACCESSORY AND REPLACEMENT

CB-376	**Firing wire,** platinum alloy ...	Each **£3. 13. 0.** *m*
CB-204	**Toroidal sealing ring.** For price see entry in List No. sequence.	

CB-260

CRUCIBLE, nickel chromium. For details and price see entry in List No. sequence.

CB-380

BOMB FILLING TUBE, high pressure nylon, 28 cm long, for connecting bomb to outlet on control box.
Each **£1. 10. 0.** *b*

REPLACEMENT PARTS

CB-226	**Toroidal sealing ring,** for CB-380	For prices see entries in List No. sequence.
CB-231	**End ferrule,** for nylon tube	
CB-232	**Nylon tubing**	

CB-234

SPANNER, to fit filling and connecting tube union nuts, size $\frac{3}{16}$ BSW. For price see entry in List No. sequence.

CB-385

CONTROL BOX, *Gallenkamp,* to specification, comprising filling, firing and galvanometer zeroing systems. **Without bomb, galvanometer or other accessories.**

For 200/250V 50 Hz single phase supplies.
Each **£65. 0. 0.** *b*

For 110/120V 50 or 60 Hz single phase supplies.
Each **£67. 0. 0.** *bN*

REPLACEMENT PART

CB-386	**Battery, 1·5V, Ever Ready D18** ...	Each **£0. 2. 0.** *m*

CB-388

REDUCING VALVE, for connecting to standard oxygen cylinders to give a constant output pressure which is adjustable over the range 20 to 30 atm. The valve is fitted with a blow-off on the outlet side set to operate at 32·5 atm and a union to accept connecting tube CB-390.
Each **£20. 0. 0.** *b*

CB-390

CONNECTING TUBE, 90 cm long, high pressure nylon, for connecting reducing valve CB-388 to control box CB-385 ... ... Each **£1. 5. 0.** *b*

CB-395

THERMOCOUPLE, complete with plug and terminations ... ... Each **£2. 12. 6.** *b*

CB-400

GALVANOMETER, spot, *Cambridge,* nominal resistance 50 ohm.

For 200/250V 50 Hz single phase supplies.
Each **£31. 10. 0.** *f*

For 110/120V 50 or 60 Hz single phase supplies.
Each **£34. 0. 0.** *fN*

REPLACEMENT PART

CB-401	**Lamp, 6V, 0·5A**	Each **£0. 2. 6.** *m*

CB-325

BENZOIC ACID, thermochemical standard.

CB-330

FIRING COTTON.

For details and prices see entries in List No. sequence.

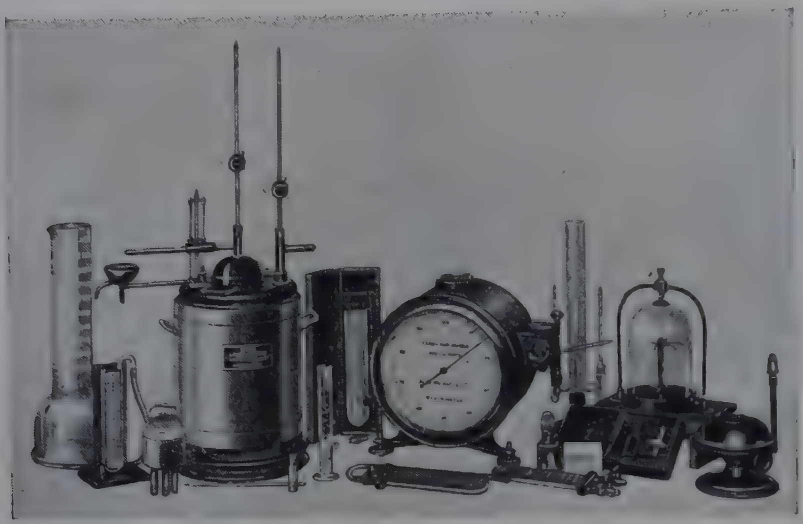
When ordering replacement parts please state serial number of calorimeter and supply voltage.

Items on this page normally available from stock except those coded *N.*

CB-500

CALORIMETER, GAS, Boys' non-recording, suitable for estimating calorific values of gases between 3560 and 5340 kcal/m³ (400–600 Btu/ft³). Complete with components CB-502 to CB-516 listed below. Each **£148. 5. 0.** *f*

Available for other gases to special order. Please state calorific value of gas to be tested.



CB-500 etc.

COMPONENTS

CB-502	**Calorimeter vessel, Boys',** with burner base, outer container, changeover funnel, overhead funnel and diaphragm tube	Each **£77. 15. 0.**	*f*
CB-504	**Cylindrical vessel,** alkali resistant, to contain coil when not in use	Each **£3. 0. 0.**	*f*
CB-506	**Thermometers** (2), 0 to 50°C in 0·1°, for water temperatures...	Pair **£4. 15. 0.**	*fS*
CB-508	**Thermometers** (2), 30 to 90°F in 1°, for gas and room temperatures	Pair **£2. 0. 0.**	*fS*
CB-510	**Lenses** (2), reading, for thermometers.	Pair **£6. 10. 0.**	*f*
CB-512	**Cylinder,** 50 ml, glass, graduated.	Each **£0. 10. 0.**	*fS*
CB-514	**Cylinder,** 2400 ml, glass, graduated.	Each **£3. 15. 0.**	*f*
CB-516	**Gas meter, Hyde,** 1/12 ft³/rev, dial subdivided 0–100. Complete with all necessary fittings.	Each **£49. 17. 6.**	*f*

ACCESSORIES

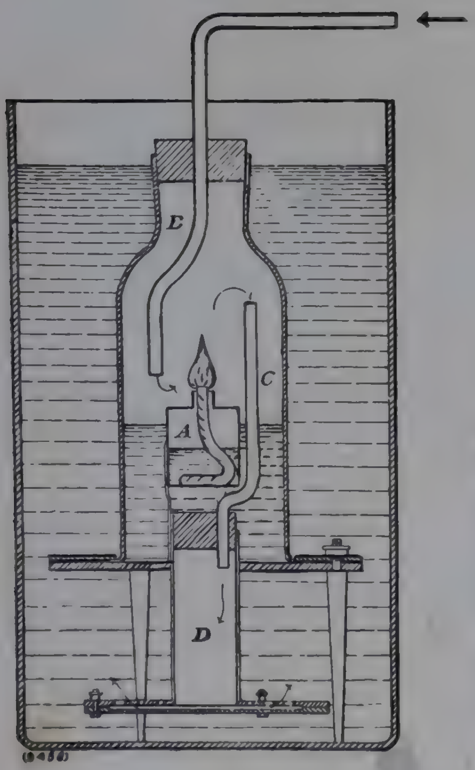
CB-518	**Gas cut-off device,** recommended for use to safeguard instrument against burn out in case of water supply failure	Each **£16. 0. 0.**	*f*
CB-520	**Gas pressure governor**	Each **£6. 15. 0.**	*f*
CB-522	**Gas pressure gauge,** U-tube ...	Each **£3. 17. 6.**	*f*
CB-524	**Pressure gauge,** U-tube, for gas pressures at meter.	Each **£3. 17. 6.**	*f*
CB-526	**Quadrant cock,** 10 cm pointer, mounted on stand.	Each **£8. 5. 0.**	*f*

CB-540

CALORIMETER, Darling's, for solid or liquid fuels, with glass outer jar, nickel crucible for solid fuels and burner adaptable for light and heavy liquid fuels. In wooden case without thermometer. Complete with instructions ... ... Each **£18. 10. 0.** *bS*

COMPONENTS AND ACCESSORIES

CB-542	**Thermometer,** 5 to 40°C in 0·05°.	Each **£3. 8. 0.**	*cS*
TJ-070	**Thermometer,** —5 to 50°C in 0·1°. For price see entry in List No. sequence.		
CB-544	**Thermometer,** 40 to 105°F in 0·1°.	Each **£3. 6. 0.**	*cS*
CB-546	**Glass jar,** 1400 ml, calibrated ...	Each **£0. 18. 0.**	*cS*
CB-548	**Bell jar,** glass	Each **£1. 4. 0.**	*cS*
CB-550	**Washer,** rubber	Each **£0. 2. 6.**	*cS*
CW-330	**Crucible,** nickel, 25 mm.	For prices see entries in List No. sequence.	
AR-540	**Asbestos yarn,** 4·5 mm, suitable as wick for calorimeter.		



CB-540

CB-580

ROLAND WILD CALORIMETER. A simple calorimeter for determining the calorific value of coal and coke. Gives reasonably accurate results in cases which do not justify the use of a high pressure bomb calorimeter. Each calorimeter is supplied with thermometer 40° to 100°F in 0·1°, certificate of water equivalent and full instructions for use.

Outline of method. This is a low pressure calorimeter in which the powdered fuel sample is ignited with sodium peroxide in a chamber immersed in water. If the specified weights of fuel and water are used the calorific value of the fuel in Btu is given by T×1000 where T°F is the measured temperature rise.

CB-580

CALORIMETER, Roland Wild, for electrical ignition and mechanical stirring ... ... Each **£43. 5. 0.** *m*

Items on this page coded *S* normally available from stock.

CC-610

CARBON DIOXIDE APPARATUS and VOLUMENOMETER, Stevenson. A simple student's apparatus for measuring the volume of gas evolved in a chemical reaction. Equivalent of a metal by replacement of hydrogen from an acid can be carried out accurately in a few minutes. The apparatus consists of a U-tube about 40 cm long, one limb graduated 100 cm^3, subdivided in 1 cm^3. **Graduated U-tube and jet only.**
Dozen **£16.10. 0.** Each **£1.10. 0.** *a*

CC-630

CARBON DIOXIDE APPARATUS, Schroedter, with standard joints 12/14 and 10/13, borosilicate glass.
Dozen **£34. 0. 0.** Each **£3. 2. 0.** *a*

COMPONENTS

CC-632	**Reaction vessel,** with 2 sockets 12/14.	Each £1. 1. 6.	*a*
CC-634	**Absorption tube,** cone 12/14 and socket 10/13.	Each £0.12. 0.	*a*
CC-636	**Tap funnel,** with cone 12/14 and socket 10/13.	Each £1. 1. 0.	*a*
CC-638	**Open stopper,** cone 10/13 with bent tube.	Dozen £2.19. 0. Each £0. 6. 2.	*a*
SU-520	**Closed stopper,** cone 10/13.	For price see entry in List No. sequence.	

CC-660

CARBON DIOXIDE APPARATUS (Calcimeter), Collins, for estimation of carbonates, particularly in soil or colliery dust ... ... Each **£17. 0. 0.** *f*

CC-661	**Flask,** 150 ml, spare for above.	Dozen £1.12. 9. Each £0. 4. 2.	*d*

CC-662

CALCULATING SLIDE RULE, for use with Collins Calcimeter ... ... Each **£3.12. 0.** *m*

CARBON DIOXIDE GAS BURETTE, Martin. Designed for the rapid estimation of carbon dioxide in worts, beers, etc. The average operator can carry out gas estimation in under 10 minutes, with greater accuracy than is usually required for brewery control purposes. The method avoids the necessity of calculations involving pressure, temperature readings, etc.
Reference : Journal of the Institute of Brewing, February 1936, p. 79.

CC-680

CARBON DIOXIDE BURETTE, Martin, as described above, without stand or accessories. Each **£8.10. 0.** *a*

ACCESSORIES

FP-581	**Separating funnel,** 500 ml	For prices see entries in List No. sequence.
MF-920	**Levelling reservoir,** 250 ml	

CC-700

CHITTICK APPARATUS, for determination of percentage of CO_2 in baking powders and chemicals†. The apparatus consists of a 250 ml decomposition flask connected to a graduated 25 ml acid burette and to a capillary manifold which leads to a gas measuring burette graduated from -25 cm^3 to $+200$ cm^3 in 1 cm^3. A 300 ml reservoir is provided for levelling and for reducing the pressure of the system. CO_2 in the sample is liberated by a displacement solution containing hydrochloric acid and the released volume is measured in the gas burette. This reading is corrected for temperature and pressure and the % CO_2 by weight is obtained. The apparatus is mounted on a wooden board with metal fixing plates to attach to wall and supplied complete with correction tables ... ... Each **£16. 10. 0.** *b*

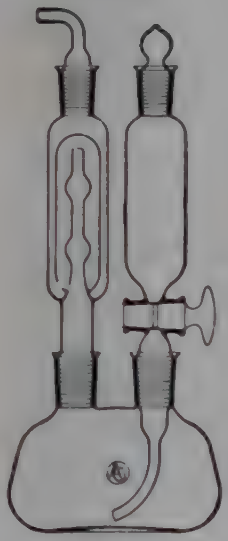
† Official Methods of Analysis of A.O.A.C.

REPLACEMENT PARTS

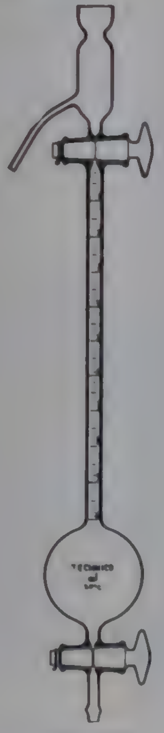
CC-702	**Gas burette,** graduated -25 cm^3 to $+200$ cm^3 in 1 cm^3.	Each £1. 7. 0.	*a*
CC-703	**Acid burette,** graduated 0 to 25 cm^3 in 1 cm^3.	Each £1. 6. 0.	*a*
CC-704	**Levelling bulb,** capacity 300 ml.	Each £0.19. 6.	*a*
CC-705	**Capillary manifold,** with stopcock.	Each £0.17. 0.	*a*
FJ-100	**Flask,** 250 ml. For price see entry in List No. sequence.		

CC-610

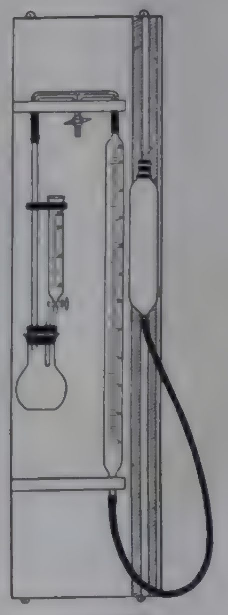
CC-660



CC-630

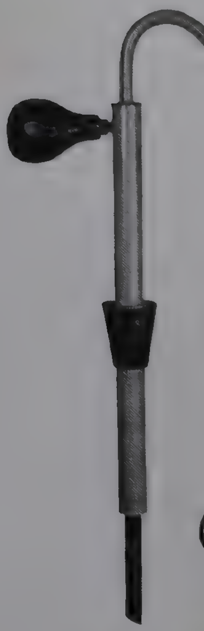


CC-680



CC-700

All items on this page normally available from stock.



CC-932

CC-938

CC-942

CC-932

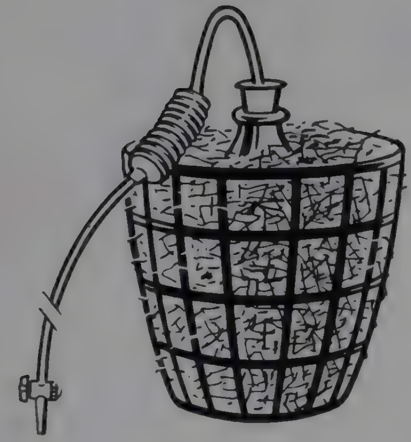
CARBOY PUMP. Constructed entirely of plastics material except for the operating bulb which is of rubber and does not come in contact with the liquid. Suitable for use in a carboy or other container having a neck dia. not less than 39 mm and depth not more than 58 cm. Maximum pumping speed about 4 to 5 litre/min. Each **£2.19. 6.** *m*

CC-938

CARBOY PUMP, polypropylene, self priming, double acting. Comprises a diaphragm pump operated by a hand lever. The moulded polythene diaphragm is fitted with non-return flap valves which allow the liquid to pass from the lower to the upper pump compartments. On each downward stroke of the handle, liquid is forced by the diaphragm through the outlet at the top of the pump housing and a further aliquot of liquid is sucked from the carboy into the lower pump compartment ready for ejection on the next stroke. This positive double-action pumping results in deliveries of about 800 litre/hour against delivery heads of up to 10 metres from a pumping rate of 60 strokes/min. The pump is supplied complete with a floor stand which fits over the carboy. Each **£30. 0. 0.** *m*

ACCESSORIES

TX-774	Tubing, PVC, 18 mm bore, is suitable for delivery pipe and 25 mm bore for suction pipe.	For price see entry in List No. sequence.



CC-945 with Carboy

CC-962

***CC-942**

CARBOY SIPHON, polythene, self priming. Comprises a flexible bulb and suction tube 36 cm long by 9 mm bore and an outlet tube 45 cm long by 9 mm bore. Flow rate approximately 4 l/min. ... Each **£0. 6. 9.** *m*

***CC-945**

CARBOY SIPHON, polythene, self priming. Comprises a flexible bellows, suction tube 70 cm long by 10 mm bore and outlet tube 95 cm long by 10 mm bore fitted with a stopcock. A sliding tapered stopper on the suction tube fits containers with neck diameters from 35 to 64 mm. Flow rate approximately 7 l/min. Each **£1.18. 0.** *m*

CC-962

CARBOY TIPPER, stove enamelled welded steel. A carboy may be placed in the frame and harnessed by a ring round the neck so that it can be safely tilted for emptying. With 15 cm rubber tyred wheels and trolley handle ... ... Each **£15.10. 0.** *m*

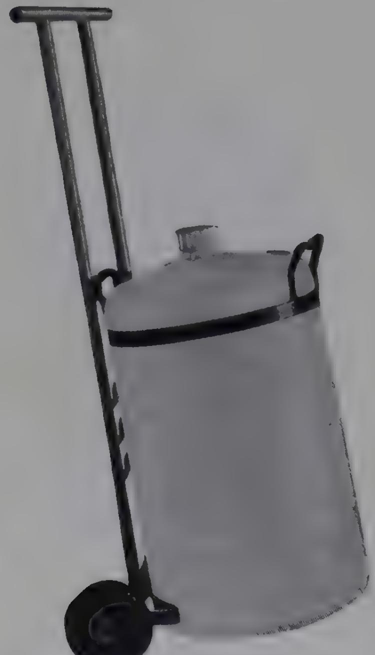
[**CC-965**

CARBOY POURER, PVC. To fit 10 gal carboys made to BS 678 and similar with neck not exceeding 84 mm outside dia. ... ... Each **£1.14. 6.** *m*

CC-980

CARBOY/BOTTLE TROLLEY, stove enamelled welded tubular steel, with 15 cm rubber tyred wheels. Two hinged hooks are arranged to support a carboy hamper and a shaped cross bar to engage the handle of the larger sizes of bottles BT-510 ... Each **£10. 0. 0.** *m*

CC-965



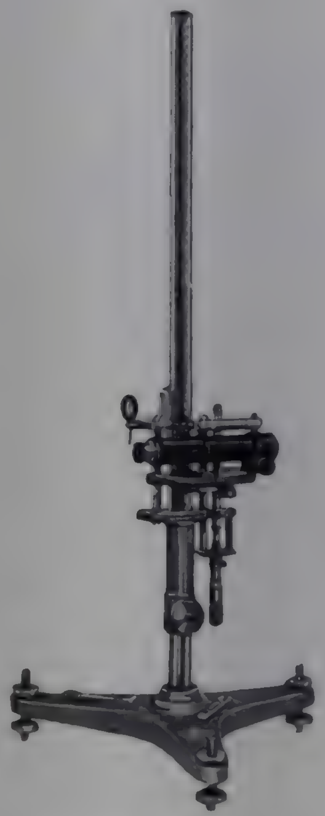
CC-980 with BT-510

CARIUS FURNACE see FURNACES
CARIUS TUBES see TUBES
CASSEROLES see BASINS

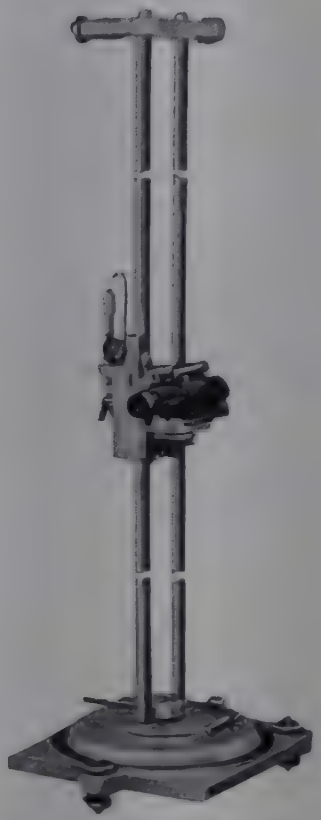
All items on this page normally available from stock.

CD-400

CATHETOMETER, *Pye,* with a telescope carriage carrying a vernier scale and movable along a substantial rustless steel column calibrated in cm and mm. The vernier reads to 0·05 mm over the full range of 100 cm. A fine adjustment slide with a traverse of 25 mm has a micrometer head reading to 0·01 mm. Mounted on heavy base casting with levelling screws and two sensitive divided levels. **Without telescope, or microscope.** Overall dimensions approximately 33 × 33 × 137 cm high. Weight approximately 13 kg ... Each **£92. 0. 0.** *f*



CD-400 with CD-430



CD-420 with CD-430

CD-420

CATHETOMETER AND MEASURING MICROSCOPE, *Pye,* with a telescope carriage carrying a vernier scale and movable along two rustless steel columns, one of which is calibrated in cm and mm. The vernier reads to 0·05 mm over the full range of 50 cm. A fine adjustment slide with a traverse of 25 mm has a micrometer head reading to 0·01 mm. Mounted on a rotating stage with circular scale reading in degrees for clamping in any position on a heavy base. The instrument may be used vertically or in two alternative horizontal positions, suitable levelling screws and sensitive spirit levels being provided. **Without telescope or microscope.** Overall dimensions approximately 25 × 25 × 80 cm high. Weight approximately 15 kg ... Each **£105. 0. 0.** *fN*

ACCESSORIES FOR CD-400 AND CD-420

CD-430

CD-430 **Cathetometer telescope,** with 2·5 cm achromatic objective, focal length 15 cm, high-powered Ramsden eyepiece, glass crosswire graticule and spirit level. Focusing range from 40 cm to infinity.
Each **£26. 0. 0.** *f*

CD-440 **Telescope/microscope kit** consisting of one each of the following components:—

Telescope CD-430.

Reading microscope with low-powered Ramsden eyepiece with crosswire. Focusing distance approximately 4 cm. Magnification ×20.

Extension piece to extend magnification of microscope to ×36. Focusing distance approximately 3·6 cm.

Eyepiece graticule 10 mm scale with 100 divisions. Interchangeable with crosswire in reading microscope.

Note: The barrel of the telescope is used as the mount for the microscope.

Complete in hardwood case with hinged lid.
Overall dimensions in case approximately 19 × 15 × 8 cm.
Weight approximately 1·3 kg ... Each **£46. 10. 0.** *fN*

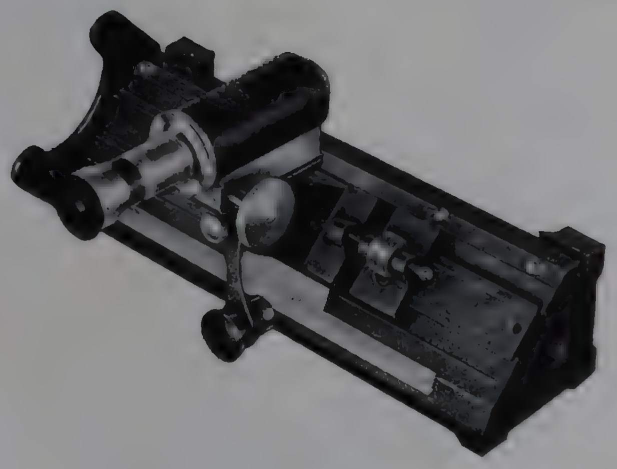
CD-440

Items on this page normally available from stock except those coded *N.*

CD-450

CD-450

VERNIER MICROSCOPE, *Pye.* A two dimensional precision instrument fitted with two large diameter 2 mm pitch lead screws at right angles giving a longitudinal range of 20 cm and cross traverse of 10 cm. Both screws are fitted with micrometer heads reading to 0·01 mm and the traverses are scaled in cm and mm. The microscope has coarse and fine focusing adjustments and is supplied with two interchangeable objectives of ×5 and ×20 magnification. The specimen table is a removable glass plate. Complete in polished wood case. Overall dimensions 46 × 37 × 31 cm. Weight 18 kg.
Each **£260. 0. 0**. *fN*



CD-480

CD-480

CATHETOMETER AND VERNIER MICROSCOPE, *Vickers.* This versatile instrument consists of a stout triangular section bed on which moves a carriage to which the microscope can be clamped in various different positions. The bed can be used vertically or horizontally. The carriage has a movement of 19 cm with vernier reading to 0·02 mm, the scale being 25 cm long to accommodate the overlap of the vernier. For use as a cathetometer the microscope objective is replaced by a telescope objective and the whole instrument mounted on a stout tripod stand with 90 cm vertical column. Complete with ×10 crossline focusing eyepiece and ×3 objective ... ... Each **£55. 14. 0.** *f*

ACCESSORIES

CD-482	**Telescope objective,** to replace microscope objective when using CD-480 as a cathetometer.	Each **£3. 8 0**	*f*
CD-484	**Tripod stand,** with a steel column, 90 cm high, 2 cm dia. and three levelling feet, for using CD-480 as a cathetometer	Each **£10. 4 0**	*f*
CD-486	**Case,** polished wood, for CD-480.	Each **£3. 18. 0.**	*f*

A range of other accessories is available for this instrument including alternative objectives, micrometer eyepiece, focusing adapters, etc. Full details and prices on application.

CD-500

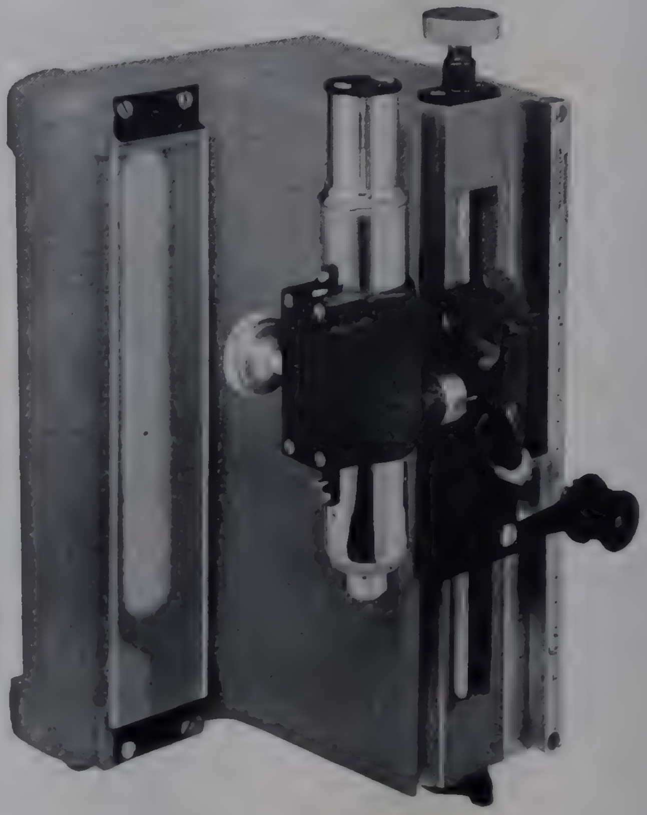
CD-500

CATHETOMETER, for use horizontally or vertically, with vernier reading to 0·01 mm over the full range of 50 cm. Consisting of a calibrated square brass bar mounted in a cast iron frame and a telescope mounted on carriage which slides along the bar. Means are provided for fine adjustment and levelling of the telescope, and focusing from 40 cm to infinity is by rack and pinion. Complete with telescope having 2·5 cm objective, ×10 Ramsden eyepiece with glass crosswire and auxiliary lens. Overall dimensions, approximately 91 × 48 × 48 cm. Weight, approximately 18·5 kg ... Each **£55. 7. 6.** *f*

Items on this page normally available from stock except those coded *N*.

CD-520

VERNIER MICROSCOPE, with vernier reading to 0·01 mm over a full range of 16·5 cm. Consisting of a cast iron base and a sliding carriage which holds the microscope. Fine adjustment of the carriage movement is provided and the carriage can be locked in position. The microscope which is focused by rack and pinion can be mounted with its axis in any one of three directions with respect to travel. A glass stage plate mounted in the base can be illuminated from underneath, from an external source, this plate has to be removed to enable the microscope to view through the base when the instrument is used as a short-range cathetometer. Complete with microscope having 5 cm working distance objective, ×7 Ramsden eyepiece and glass crossline graticule giving a total magnification of approximately ×20, all mounted in a hardwood case. Overall dimensions of case approximately 35 × 19 × 22 cm. Weight approximately 10 kg .. .. Each **£39. 12. 6.** *f*



CD-520

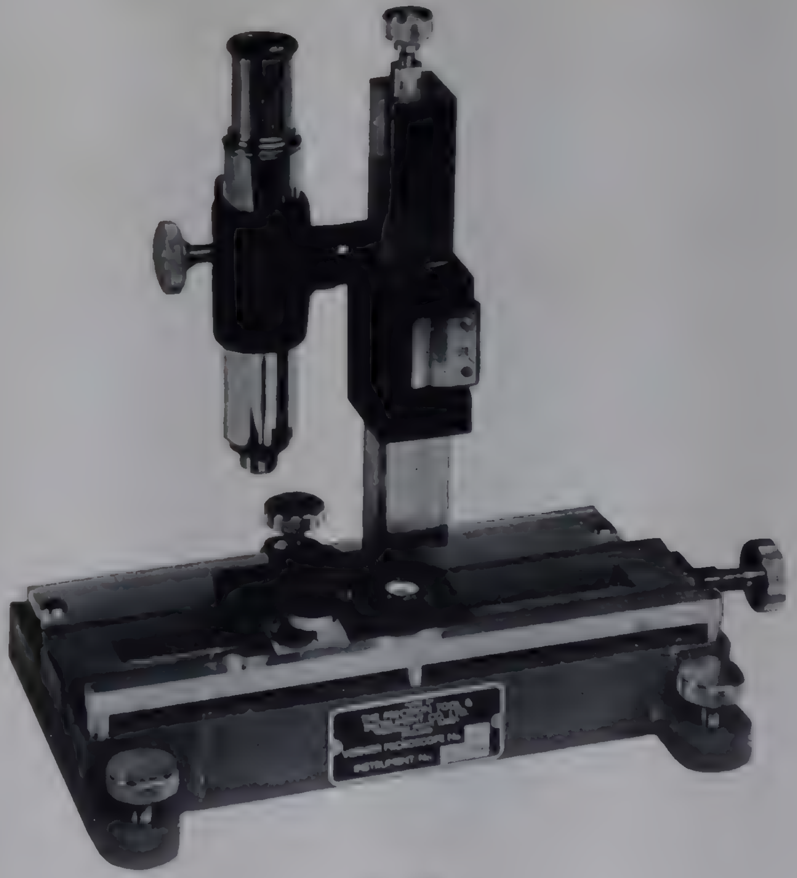
CD-530

VERNIER MICROSCOPE, with verniers reading to 0·01 mm over a horizontal scale of 16·5 cm and a vertical scale of 12 cm. Consisting of a cast iron base, horizontal carriage with magnifier to read the calibrations, and microscope focused by rack and pinion mounted on the calibrated vertical column which is supported on the horizontal carriage. Both carriages have fine adjustment and locking screws. The base is fitted with a glass stage plate which can be illuminated from underneath, from an external source. Complete with microscope having 5 cm working distance objective, ×7 Ramsden eyepiece and glass crossline graticule, giving a total magnification of ×20, all mounted in a hardwood case. Overall dimensions of case approximately 34 × 25 × 23 cm. Weight approximately 10 kg ... Each **£53. 15. 0.** *f*

ACCESSORIES FOR CD-520 AND CD-530

CD-535 **Telescope objective,** to increase the working distance to approximately 20 cm. Interchangeable with microscope objective ... ... Each **£2. 7. 6.** *f*

CD-540 **Illumination base,** consisting of 23 cm fluorescent tube mounted in an aluminium case. The top of the case is designed to locate the vernier microscopes CD-520 and CD-530 and provide full illumination of the stage plates. For 230V 50 Hz supplies ... ... Each **£6. 10. 0.** *f*



CD-530

All items on this page normally available from stock.

CENTRIFUGES

SECTION INDEX

TYPE	MODEL	PAGE
Hand drive, for school and field use	CF-101	117
Semi-micro, to replace filtration in semi-micro scale work	*Gallenkamp* CF-200	117
General purpose, capacity up to 200 ml	*Gallenkamp* CF-405	118
General purpose, capacity up to 400/500 ml	*International* CH-025	123
	Gallenkamp CF-600	120
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Angle, high speed, for difficult separations	*International* CH-040	123
Continuous action, for the recovery of solids, clarification and separation of immiscible liquids	*International* CH-225 with CH-245	126
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Helixtractor continuous flow unit	*International* CH-245	127
Tubes, bottles and accessories		131 to 134

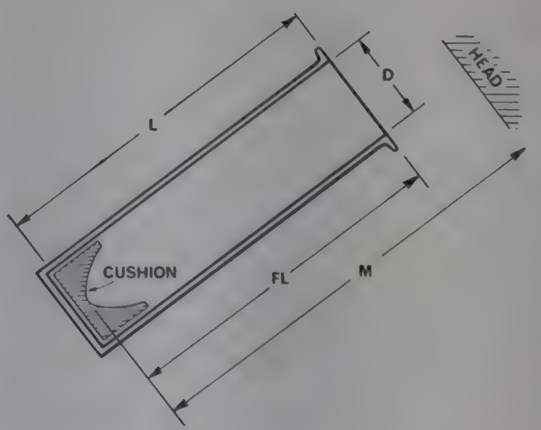
Special purpose centrifuges will be found under the following title heading: DAIRY PRODUCTS, MEDICAL, PETROLEUM.

Gallenkamp CENTRIFUGES

FITTING CHART FOR TUBES AND BUCKETS

The following table shows the internal dimensions of the buckets listed for *Gallenkamp* centrifuges as a guide to the choice of suitable centrifuge tubes whose external dimensions are shown illustrated on pages 131 to 133.

Model	Bucket List No.	Material	Capacity (ml)	Use cushion List No.	Dimension L (mm)	Dimension FL (mm)	Dimension D (mm)	Dimension M (mm)
SEMI-MICRO	**CF-205**	Polypropylene	5	—	69·5	—	10·3	81·5
JUNIOR	**CF-452**	Stainless steel	15	**CJ-305**	93	82	18·0	AH
	CF-454	Brass	50	**CJ-320**	95	89	30·0	114·5
UNIVERSAL	**CF-672**	Stainless steel	15	**CJ-310**	111	99	18·0	AH
	CF-674	Brass	50	**CJ-320**	117	110	30·0	127·0
	CF-676	Steel	50	**CJ-320**	116	109	30·0	AH
	CF-678	Brass	100	**CJ-340**	129	125	34·0	158·7
	CF-680	Steel	250	**CJ-350**	129	121	63·5	136·5



NOTE: 'AH' indicates bucket used only in angle heads.
'M' is the maximum length of tube which can be used without fouling centrifuge head.

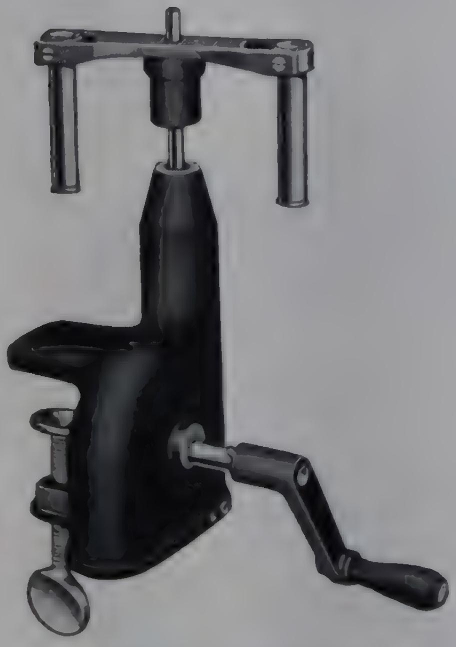
HAND CENTRIFUGE

CF-101

CENTRIFUGE, hand drive. A robust cast housing, with integral bench clamp, fully encloses a machine cut gear train which enables the centrifuge to be turned at high speed with the minimum of effort. The housing is finished in stove enamel and has a plated bearing housing for the rotor shaft. With removable handle but without heads or glassware ... ... Each **£5. 0. 0.** *m*

REPLACEMENT PART

CF-103 **Driving handle,** spare for CF-101. Each **£0. 16. 6.** *m*



CF-101 with CF-106

CF-108

HEADS FOR HAND DRIVE CENTRIFUGE

CF-106

HEAD, 2-place, 15 ml. Stove enamelled, with two buckets for tubes up to 15 ml capacity. Each **£2. 2. 0.** *m*

CF-108

HEAD, 4-place, 15 ml. Stove enamelled, with four buckets for tubes up to 15 ml capacity. Each **£3. 8. 0.** *m*

Gallenkamp
REGD TRADE MARK

SEMI-MICRO CENTRIFUGE

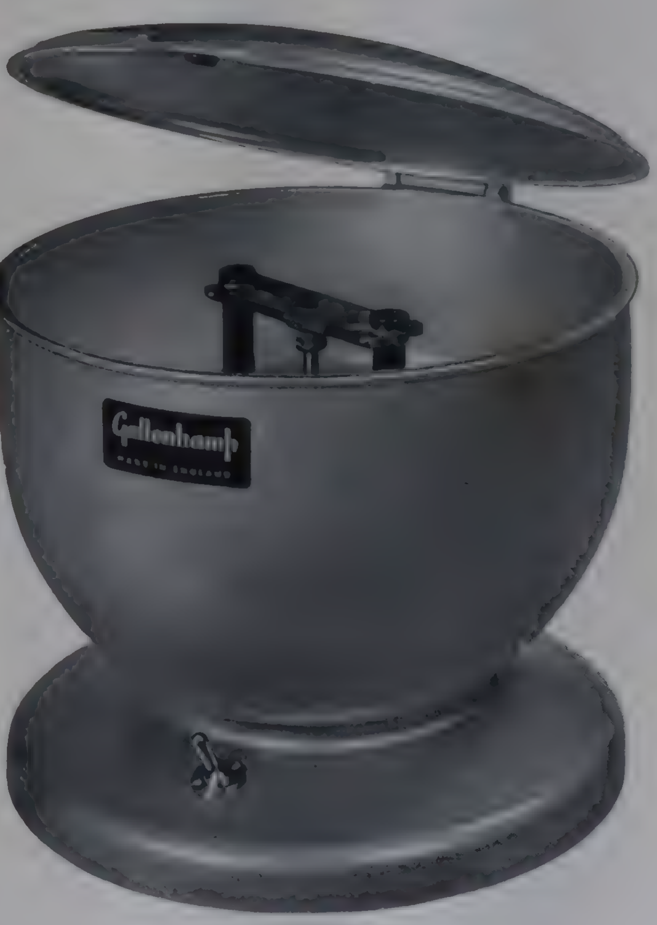
A low priced machine used in schools and colleges for small scale solid-liquid separations in place of the slower and more cumbersome method of filtration.

The centrifuge bowl and base are combined in a single light alloy diecasting with a hinged cover and are finished in grey duotone enamel.

The head, which has two buckets, will swing two standard 75 × 10 mm dia. test tubes at a speed of approximately 2000 rev/min. It is driven by an induction motor which is controlled by a biased-off switch on the base.

The centrifuge is mounted on three rubber feet and is supplied with mains 3-core cable.

Overall dimensions 23 cm high × 28 cm dia.



CF-200

CF-200

CENTRIFUGE, *Gallenkamp*, **semi-micro,** as above specification. **Without glassware.**

For 220/240V 50 Hz single phase supplies. Each **£9. 5. 0.** *b*

For 200/210V 50 Hz single phase supplies. Each **£9. 5. 0.** *bN*

For 110/120V 60 Hz single phase supplies. Each **£9. 5. 0.** *bN*

When ordering please state voltage and nature of supply.

ACCESSORIES

TF-180 **Test tubes,** *Pyrex brand*, 75 × 10 mm. For price see entry in List No. sequence.

REPLACEMENT PART

CF-205 **Bucket.** Dozen pairs **£2. 12. 0.** Pair **£0. 5. 8.** *b*

When ordering replacement parts please state serial number of centrifuge and supply voltage.

Items on this page normally available from stock except those coded *N*.

Gallenkamp JUNIOR CENTRIFUGE

REGD TRADE MARK

Gallenkamp
Junior
CENTRIFUGE
TIMER
SPEED

CF-405

- **Self-balancing action**
- **Repeatable five-step speed control**
- **Maximum speed 5000 rev/min**
- **Built-in timer**

The *Gallenkamp* Junior Centrifuge meets the requirements of hospitals and small industrial laboratories for a reliable, safe, yet inexpensive machine to take tubes up to 50 ml capacity. It is precision-built throughout, with the finest materials and components.

GENERAL DESIGN

The centrifuge has a robust guard bowl and cover, which completely enclose the head and protect the operator from accidental contact with rotating parts, broken glassware etc. In operation a continuous stream of air is drawn through the bowl and all parts remain cool, even after long periods of use. The motor and controls are housed below the bowl and, although totally enclosed for safety, they are readily accessible for the routine servicing. The interior of the bowl and all external surfaces are finished with a smooth easily cleaned stoved enamel which is resistant to abrasion and corrosion.

MOTOR

The motor is a powerful ball bearing universally wound type supported on very flexible rubber mountings. This system enables the axis of rotation of the motor to change as required to compensate for out-of-balance loads without communicating this movement to the housing.

Critical balancing of the tubes is, therefore, unnecessary and the centrifuge will run quietly in conditions which would be completely impracticable with a conventional motor mounting. Suppressors are fitted to eliminate television interference.

CONTROLS

The speed control switch, which has an 'OFF' and five speed positions, allows accurate repetition of operating speed. The speeds are chosen so that the change in centrifugal force is approximately constant from one step to the next.

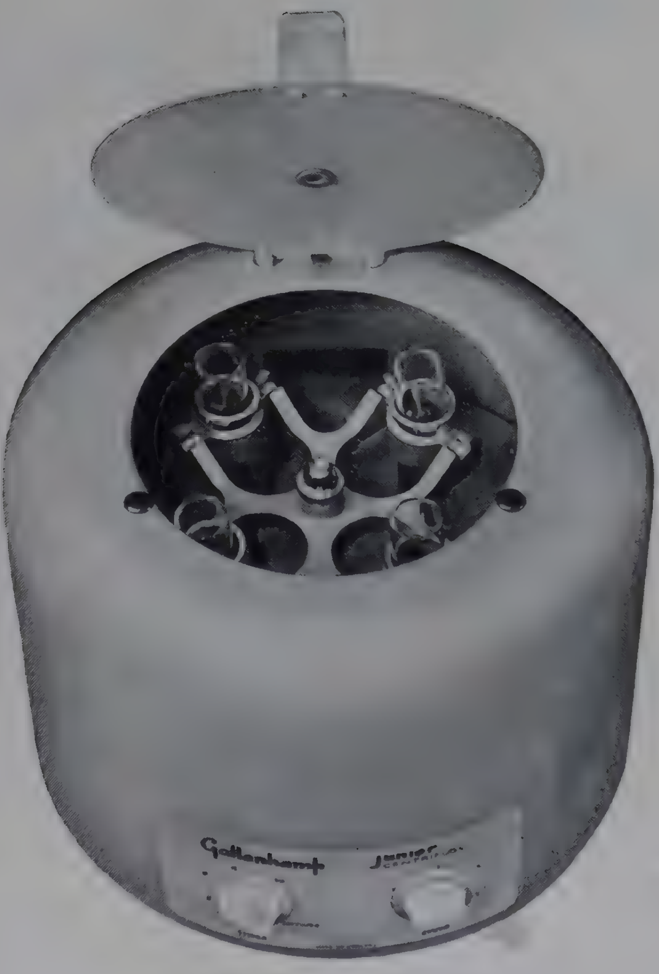
The timer can be set to give automatic control of running time up to 20 min. It can also be set for continuous running. Tachometer CF-480, which is specially designed for use with this centrifuge, can be inserted through an aperture in the cover for speed measurement.

HEADS

Various swingout and angle heads are available. They are located on the tapered motor shaft and are held in place by a milled nut. All the heads are accurately balanced and designed for smooth running at maximum speed. The versatility of the heads is increased by a 2-place carrier and by adapters which can be used in the buckets to accommodate tubes for micro work, Wintrobe tests etc.

The head determines the maximum speed and centrifugal force attainable; capacities, speeds and RCF values are listed below.

DIMENSIONS: 30 cm high × 35 cm diameter (12 × 14 in).
WEIGHT: 10 kg (21 lb).



CF-405 with CF-430

SPEED AND RCF VALUES FOR JUNIOR CENTRIFUGE HEADS

LIST No.	TYPE	LOAD No. × ml	MAX. SPEED rev/min	MAX. RCF × g
CF-420	swingout	6 × 15	3,000	1,500
CF-430	,,	4 × 50	3,000	1,500
CF-430	,,	8 × 15	3,000	1,500
CF-440	angle	6 × 15	5,000	2,750

Gallenkamp JUNIOR CENTRIFUGE

CF-405

CENTRIFUGE, *Gallenkamp* **Junior,** as specification, with self-balancing drive, built-in speed control and timer but **without heads or accessories.** For single phase supplies.

For 220/240V 50 Hz ... ... Each **£32.10. 0.** *b*
For 200/210V 50 Hz ... ... Each **£33. 0. 0.** *bN*
For 110/120V 50 or 60 Hz ... ... Each **£33. 0. 0.** *bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PART

CF-407 Carbon brushes for motor ... Pair **£0. 5. 6.** *b*

When ordering replacement parts please state serial number of centrifuge and supply voltage.

HEADS FOR *Gallenkamp* JUNIOR CENTRIFUGE

CF-420

HEAD, 6-place, with 15 ml buckets. Consisting of a manganese bronze casting, brass trunnion rings with stainless steel pins, six stainless steel buckets CF-452 and six rubber cushions CJ-305. For tubes up to 15 ml. **Without tubes** ... ... Each **£13. 0. 0.** *b*

CF-420

CF-430

HEAD, 4-place, with 50 ml buckets. Consisting of a manganese bronze casting, four detachable die-cast aluminium bronze trunnion rings, four 50 ml brass buckets CF-454 and four rubber cushions CJ-320. For tubes up to 50 ml, 1 oz universal containers and trunnion carrier CF-435. **Without tubes** ... Each **£13.10. 0.** *b*

CF-430

CF-435

TRUNNION CARRIER, 2-place, 15 ml, for head CF-430 in place of the 50 ml trunnion rings. Supplied in balanced pairs with four 15 ml stainless steel buckets CF-452 and four rubber cushions CJ-305. For tubes up to 15 ml. **Without tubes** ... ... Pair **£5. 3. 0.** *b*

CF-435

CF-440

HEAD ANGLE, 6-place, with 15 ml buckets. The head is machined from a light alloy casting and is fitted with six stainless steel buckets CF-452 and six rubber cushions CJ-305. For tubes up to 15 ml. **Without tubes** ... ... Each **£12. 0. 0.** *b*

REPLACEMENT PARTS

CF-452 **Bucket,** stainless steel 15 ml. **Without cushion CJ-305.** Pair **£1.18. 0.** *b*

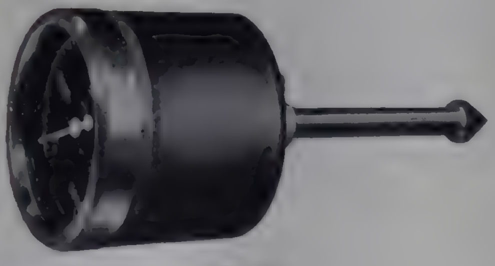
CF-454 **Bucket,** brass, 50 ml. **Without cushion CJ-320.** Pair **£3.12. 0.** *b*

CF-440

CENTRIFUGE TUBE AND BUCKET fitting chart see page 116.

CF-480

TACHOMETER, hand type, 13 cm long scale calibrated 0 to 5000 rev/min in white on a black dial. Complete with extended spindle and rubber adapter suitable for use with centrifuge CF-405. Clockwise rotation. Each **£5.16. 0.** *c*


CF-480

Centrifuge tubes see pages 131 to 133.

Items on this page normally available from stock except those coded *N*.

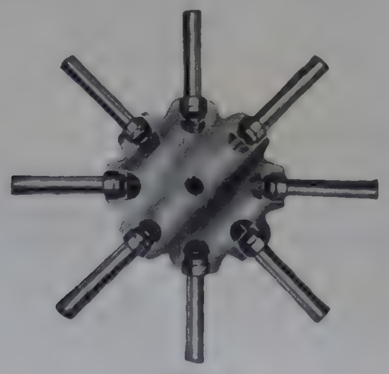
Gallenkamp UNIVERSAL CENTRIFUGE

- **Maximum speed 5000 rev/min**
- **Interchangeable heads**
- **Efficient air cooling**
- **Integral speed indicator**
- **Simple routine maintenance**

CF-600

HEADS FOR UNIVERSAL CENTRIFUGE

Five swingout and two angle heads are available for use with the centrifuge. The capacities, speeds and RCF values of these heads are listed opposite. A full range of adapters is available to increase the versatility of the heads. The heads are a sliding fit on the motor shaft which has a locating key and a nut to hold them in position. They are fully interchangeable and carefully balanced during manufacture.



CF-630

A general purpose laboratory centrifuge for a wide range of routine and research applications in all types of laboratories.

The centrifuge guard bowl is an annealed iron casting fitted with a hinged cast cover which closes on to rubber buffers and is held shut by a strong catch. The interior is finished with smooth stoved enamel, easy to clean, resistant to abrasion and providing good protection of the bowl from corrosion due to spilt samples.

In operation, a stream of air is drawn through the bowl by the action of the head and even after prolonged running of the largest head at maximum speed, a temperature rise of only about 10°C above ambient is experienced.

The heavy duty motor is fully enclosed and the lower section is readily accessible for routine lubrication of the lower bearing and inspection of the motor brushes. A suppressor which eliminates radio and television interference is fitted.

The centrifuge is supplied with a separate speed control rheostat and a built-in electric speed indicator calibrated up to 6,000 rev/min.

DIMENSIONS: 57 cm high × 45 cm maximum diameter.

WEIGHT: 64 kg net.

CF-600

CENTRIFUGE, *Gallenkamp,* **Universal,** as specification, but **without heads or accessories.**

For 200/250V 50 Hz single phase supplies.
Each **£180. 0. 0.** *b*

For 110/120V 50 or 60 Hz single phase supplies.
Each **£182. 10. 0.** *bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PART

CF-620 Carbon brushes, for motor ... Pair **£0. 17. 0.** *b*

When ordering replacement parts please state serial number of centrifuge and supply voltage.

SPEED AND RCF VALUES FOR UNIVERSAL CENTRIFUGE HEADS

LIST No.	TYPE	LOAD No. × ml	MAX. SPEED rev/min	MAX. RCF × g
CF-630	swingout	8 × 15	4,000	2,850
CF-635	,,	4 × 15 4 × 50	4,000	3,100
CF-640	swingout	4 × 50	4,000	2,800
CF-645	,,	4 × 100	4,000	3,400
CF-650	,,	4 × 250	3,000	1,800
CF-655	angle	16 × 15	5,000	3,400
CF-660	,,	8 × 50	4,000	2,150

CF-630

HEAD, 8-place, with 15 ml buckets. Consisting of a manganese bronze casting, brass trunnion rings with stainless steel pins, eight stainless steel buckets CF-672 and eight rubber cushions CJ-310. For tubes up to 15 ml capacity. **Without tubes** ... ... Each **£25. 10. 0.** *b*

Items on this page normally available from stock except those coded *N.*

Gallenkamp UNIVERSAL CENTRIFUGE

CF-635

HEAD, 8-place combination, with four 15 ml and four 50 ml buckets. Consisting of a manganese bronze casting, brass trunnion rings with stainless steel pins, four 15 ml stainless steel buckets CF-672 with rubber cushions CJ-310 and four 50 ml brass buckets CF-674 with rubber cushions CJ-320. For tubes up to 50 ml capacity and 1 oz universal containers. **Without tubes.**
Each **£33. 0. 0.** *b*

CF-635

CF-640

HEAD, 4-place, with 50 ml buckets. Consisting of a manganese bronze casting, brass trunnion rings with stainless steel pins, four brass buckets CF-674 and four rubber cushions CJ-320. For tubes up to 50 ml capacity and 1oz universal containers. **Without tubes.**
Each **£24. 5. 0.** *b*

CF-645

HEAD, 4-place, with 100 ml buckets. Consisting of a manganese bronze casting, brass trunnion rings with stainless steel pins, four brass buckets CF-678 and four rubber cushions CJ-340. For 100 ml tubes CJ-160. **Without tubes** ... ... Each **£27. 10. 0.** *b*

CF-650

CF-650

HEAD, 4-place, with 250 ml buckets. The head is machined from a steel forging and has steel trunnion rings and pins. Supplied with four heavily plated steel buckets CF-680 and four rubber cushions CJ-350. For 250 ml bottles CJ-210. **Without bottles.**
Each **£68. 10. 0.** *b*

CF-655

HEAD, ANGLE, 16-place, with 15 ml buckets. The head is machined from a light alloy casting and is supplied complete with sixteen 15 ml stainless steel buckets CF-672 with rubber cushions CJ-310. For tubes up to 15 ml capacity. **Without tubes** ... ... Each **£32. 5. 0.** *b*

CF-660

CF-660

HEAD, ANGLE, 8-place, with 50 ml buckets. The head is machined from a light alloy casting and is supplied complete with eight 50 ml steel buckets CF-676 with rubber cushions CJ-320. For tubes up to 50 ml capacity. **Without tubes** ... ... Each **£35. 10. 0.** *b*

REPLACEMENT PARTS

CF-672	**Bucket,** stainless steel, 15 ml. **Without cushion CJ-310**	Pair **£2. 0. 0.**	*b*
CF-674	**Bucket,** brass, 50 ml. **Without cushion CJ-320.**	Pair **£3. 12. 0.**	*b*
CF-676	**Bucket,** steel, 50 ml. **Without cushion CJ-320.**	Pair **£2. 15. 0.**	*b*
CF-678	**Bucket,** brass, 100 ml. **Without cushion CJ-340.**	Pair **£4. 2. 0.**	*b*
CF-680	**Bucket,** steel, 250 ml. **Without cushion CJ-350.**	Pair **£6. 0. 0.**	*b*

Centrifuge tube and bucket fitting chart see page 116.

Centrifuge tubes and bottles see pages 131 to 133.

Rubber cushions and **adapters** see page 134.

For suitable lubricant see LX-220 in List No. sequence.

All items on this page normally available from stock.

INTERNATIONAL CENTRIFUGES

MADE IN U.S.A.

We are the sole agents in Great Britain, Northern Ireland, Eire and Commonwealth Territories for the International Equipment Company.

International Equipment Company was founded in Cambridge, Massachusetts in 1901 and is one of the largest manufacturers of laboratory centrifuges and ultracentrifuges. Their products have long held a high-standing reputation for quality with a special emphasis on simplicity and maximum built-in safety for the operator.

At I.E.C's modern plant, Research and Development facilities are maintained, utilising the latest scientific equipment. One such outstanding facility, for example, is a unique spin-pit (see photograph on p. 125) where high speed heads and rotors are subjected to severe tests. These are monitored by remote control and high speed cameras. One unit is selected at random from each manufactured batch and is then tested far beyond normal requirements. Equal testing takes place prior to shipment. The spin-pit also provides the Company's project engineers with information vital to prototype development.

The electrical circuits of I.E.C. centrifuges are designed to conform with the requirements of the National Electrical Code and to the insurance requirements of the Underwriters Laboratories of the United States and the Canadian Standards Association where these are applicable. Electric shock hazards are eliminated through careful housing of the components, efficient earthing and by high tension dielectric testing between electrical components and centrifuge chassis.

Centrifuges which could be damaged by switching on with the speed controller at maximum are fitted with interlocks so that the controller must be returned to zero before the motor can be started. Heads, rotors and accessories spin in rugged guard bowls of armour quality steel to ensure containment in case of accidental failure.

Refrigerated centrifuges and ultracentrifuges are subjected to in-line testing with sophisticated test instruments, the test procedures encompassing every function of the machine to ensure that the most exacting standards are met.

These rigid tests on all products are recorded and kept on file for future reference.

Special care is taken during design stages to ensure simple routine maintenance, each component being readily and quickly accessible. Stocks of commonly required replacement parts such as motor brushes, bearing lubricants, etc. are maintained in London, and our Service Department with factory trained engineers are able to undertake routine servicing, overhaul and special repair work on all models of centrifuge.

Importation of I.E.C. Centrifuges. At the time of going to press, all International centrifuges intended for use in the U.K. are liable to import duty. In certain cases, purchasers may apply for remission of duty and our Sales Department will be pleased to assist and advise on this matter.

INTERNATIONAL CENTRIFUGES

LIST No.	MODEL	BRIEF DESCRIPTION
CH-025	HN	General purpose, bench standing. Accessories for ASTM D96 and dairy tests and heated bowl model available.
CH-040	HT	High speed, bench standing, simple conversion for remote control.
CH-065	CS	General purpose, floor standing.
CH-110	UV	General purpose, floor standing, large capacity.
CH-220 CH-222	PR-2 PR-6	Refrigerated, floor standing. Wide range of blood processing accessories.
CH-225	B-20	High speed, refrigerated, floor standing, with programmed operation.
CH-245	—	*Helixtractor* accessory for models HT to B-20 inclusive. Unique continuous flow micro deposit separator.
CH-250 CH-260	B-35 B-60	Refrigerated vacuum and high vacuum ultracentrifuges of the most advanced designs.

INTERNATIONAL CENTRIFUGES

MODEL HN

CH-025

A bench top centrifuge with features of many console models.

- **Stepless speed control**
- **Electric brake**
- **Built-in timer**

PERFORMANCE AND OPERATION

For runs of 2–60 minutes the electric timer is preset to the period required and the 3-position power switch is moved up to the 'timed run' position. For longer runs the switch is moved down to the untimed run position. Speed is adjusted by a dial-controlled stepless autotransformer. After switching off, the centrifuge will coast to a halt but by switching in the electric brake this coasting time is reduced by 75%.

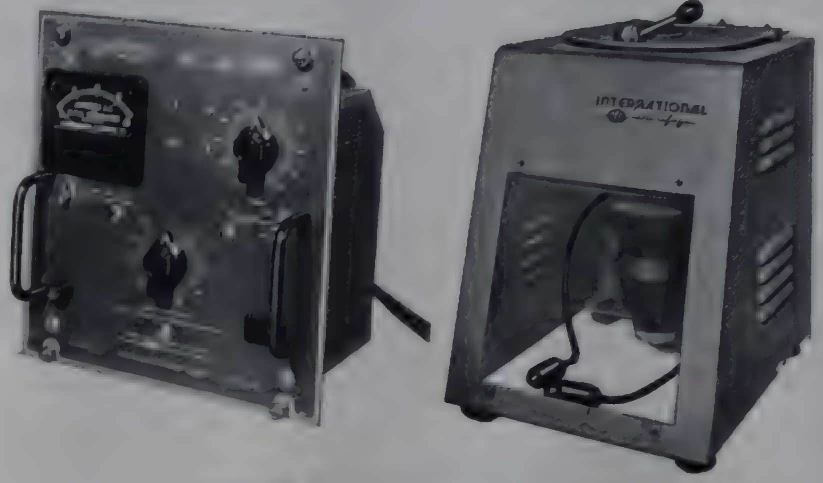
Range of heads		Load No. × ml	Max. speed rev/min	Max. RCF × g
7 Swingout	from	30 × 3	3300	1390
	to	4 × 100	2700	1520
11 Angle	from	24 × 15	3700	2000
	to	8 × 50	4300	2460
2 Haematocrit	to	24	7800	6190

DIMENSIONS	42 cm dia. × 43 cm height
WEIGHT	23 kg net
MOTOR RATING	230W

***CH-025**
CENTRIFUGE, *International* **MODEL HN.** Full details on application ... ... Price range **£120** to **£170** *f*

***CH-030**
CENTRIFUGE, *International,* **HEATED MODEL HN.** Full details on application ... Price range **£190** to **£230** *f*

MODEL HT



CH-040 showing panel removed for remote control

A unique, high speed, angle head bench model.

- **Rapid adaption to remote control**
- **Dual purpose ammeter/tachometer**
- **Self cooling, self balancing**
- **Bearings lubricated for life**

PERFORMANCE AND OPERATION

For runs of 2–120 minutes a timer is fitted but this may be switched out for longer runs. Speed control is by stepless autotransformer. If the main electricity supply is interrupted during running, an automatic cut-out prevents the motor being restarted before the speed control has been returned to zero. The controls are all mounted on a single front panel and are fully enclosed. This panel may be removed and by means of extension leads used remotely to operate the centrifuge.

Range of heads		Load No. × ml	Max. speed rev/min	Max. RCF × g
4 Angle	from	24 × 12	17,000	35,000
	to	8 × 50	20,000	39,000

	H W D
DIMENSIONS	55 × 36 × 43 cm
WEIGHT	52 kg net
MOTOR RATING	1200W

***CH-040**
CENTRIFUGE, *International* **MODEL HT.** Full details on application ... ... Price range **£380** to **£410** *f*

Price ranges are approximate and include 1 head with buckets but exclude any duty payable.

INTERNATIONAL CENTRIFUGES

MODEL CS

CH-065

One of the most popular I.E.C. models having the widest range of applications.

- Up to 1400 ml capacity
- Stainless steel guard bowl
- Built-in timer and electric brake
- Continuous reading tachometer
- Safety mains cut-out

Range of heads		Load No. × ml	Max. speed rev/min	Max. RCF × g
14 Swingout	from	64 × 10	3100	1920
	to	4 × 250	3300	2440
14 Angle	from	36 × 15	4000	3130
	to	14 × 100	3400	2550
2 Angle multispeed		6 × 7	23,400	37,950
4 Basket	from	2800 ml	3500	1390
	to	3000 ml	3500	1900

	H × W × D
DIMENSIONS	94 × 51 × 64 cm
WEIGHT	118 kg net
MOTOR RATING	800W

***CH-065**
CENTRIFUGE, *International* **MODEL CS.** Full details on application ... ... Price range **£300** to **£420**

MODEL UV

CH-110

A large capacity, versatile centrifuge for general purposes.

- Up to 2400 ml capacity
- Stainless steel guard bowl
- Built-in timer and electric brake
- Continuous reading tachometer
- Safety mains cut-out

Range of heads		Load No. × ml	Max. speed rev/min	Max. RCF × g
13 Swingout	from	168 × 3	2500	1360
	to	4 × 600	2400	1460
9 Angle	from	60 × 10	4500	3170
	to	6 × 250	4300	3870
2 Angle multispeed		6 × 7	23,400	37,950
2 Basket to		3000 ml	3500	1900

	H × W × D
DIMENSIONS	89 × 74 × 61 cm
WEIGHT	165 kg net
MOTOR RATING	800W

***CH-110**
CENTRIFUGE, *International,* **MODEL UV.** Full details on application ... Price range **£330** to **£450**

Price ranges are approximate and include 1 head with buckets but exclude any duty payable.

INTERNATIONAL CENTRIFUGES

MODELS PR-2 AND PR-6

Refrigerated centrifuges with accessories for many applications including Blood Bank use.

- Up to 4 litre capacity
- RCF up to 4200 g (PR-2)
  7900 g (PR-6)
- Accept multispeed head up to 25,000 g
- Head for standard blood bottle available
- Refrigeration from ambient of 30°C
  down to −15°C (PR-2)
  −30°C (PR-6)
- Guard bowl with integral evaporator
- Solid state speed control system (PR-6)
- Automated console controls (PR-6)
- Preset timer 0–120 minute (PR-2)
  0–15 minute (PR-6)
- Safety interlocks between electrical systems

CH-220

PERFORMANCE
MODEL PR-2

Range of heads		Load No. × ml	Max. speed rev/min	Max. RCF × g
7 Swingout	from	64 × 10	2700	1460
	to	4 × 1000	2300	1370
16 Angle	from	60 × 10	4200	3630
	to	6 × 250	3900	3180
4 Angle multispeed	from	6 × 7	19,000	25,000
	to	8 × 50	11,000	14,400

MODEL PR-6

Will accept the same range of heads as above but, with the swingout and angle heads, will provide higher speeds and nearly double the RCF values.

		H	W	D
DIMENSIONS	**PR-2**	107 ×	97 ×	71 cm
	PR-6	93 ×	85 ×	80 cm

WEIGHT	**PR-2**	283 kg net
	PR-6	272 kg net

*CH-220

CENTRIFUGE, *International* **MODEL PR-2.** Full details on application ... Price range £950 to £1140 *f*

*CH-222

CENTRIFUGE, *International* **MODEL PR-6.** Full details on application. Price range £1065 to £1255 *f*

For details of zonal heads see page 129.

CH-222

Price ranges are approximate and include 1 head with buckets but exclude any duty payable.

INTERNATIONAL CENTRIFUGES

MODEL B-20

This centrifuge is designed to a specification of quality so complete in every detail as to make it an extremely versatile and advanced high speed and general purpose centrifuge.

- **Spins from 3000 up to 20,000 rev/min**
- **RCF values up to 46,300 g**
- **Uniform, fast, automatically controlled acceleration**
- **Solid state speed control system**
- **Built-in temperature controller and high power refrigerator**
- **Fluctuation ±1°C between —30 and +30°C**
- **No critical balancing of tubes**
- **Digital display of total elapsed running time**
- **Incorporates timer, tachometer and electric brake**
- **Master control for selection of operational programme**

CH-225

CONSTRUCTION

Mounted on castors, the Model B-20 is of steel frame construction with beige hammertone stove enamelled outer panels. The centrifuge chamber has a smooth stainless steel interior with an outer guard of armour plate. Raised involute curves moulded to the underside of the lid cause an air downdraught which cools the centrifuge head in use. Belt drive from the motor to the head minimises vibration and noise and because the motor speed is only one third that of the head, motor maintenance is negligible.

CONTROL PANEL

To operate the B-20: Set the desired temperature on the refrigeration control (1); select the time desired for the run (2); select the desired speed (3); turn the Master Control Knob (4) to the BRAKE or COAST position; the unit will automatically reach operating temperature, accelerate to speed and brake or coast to a stop. If it is desired to run the unit longer than 120 minutes, turn to CENTRIFUGE—NOT TIMED on the master control. The COAST position is provided for very lightly suspended sediments.

PERFORMANCE AND OPERATION

Typical performance figures

Tubes	Speed rev/min	RCF × g
6 × 250 ml	14,500	28,500
12 × 14 ml	20,000	40,000
24 × 13 ml	19,500	46,300

TECHNICAL DATA

Refrigerator motor rating	1½ hp
Centrifuge motor rating	4000W
Electric timer	2–120 minutes
Electrical supply	210–260V 50 Hz single phase
Maximum load	20A
	H W D
Overall dimensions	94 × 115 × 76 cm
Weight	419 kg net

***CH-225**

CENTRIFUGE, *International* **MODEL B-20,** as specification but **without heads.** ... Each **£1107. 0. 0.** *f*

When ordering please state voltage and nature of supply.

The price includes delivery and installation but is exclusive of import duty.

INTERNATIONAL CENTRIFUGES

HEADS FOR MODEL B-20. All heads have an unlimited life and de-rating is unnecessary.

List No.	Type	Capacity	Speed rev/min	RCF × g	EACH	
***CH-227**	870 fixed angle	8 × 50 ml	19,500	45,100	**£75. 0. 0.**	*f*
***CH-229**	872 fixed angle	6 × 250 ml	14,500	28,850	**£143. 10. 0.**	*f*
***CH-231**	873 fixed angle	12 × 14 ml	20,000	40,000	**£120. 0. 0.**	*f*
***CH-233**	874 fixed angle	24 × 13 ml	19,500	46,300	**£132. 0. 0.**	*f*
***CH-235**	940 horizontal	4 × 40 ml	12,000	20,000	**£263. 0. 0.**	*f*
***CH-237**	947 horizontal	4 × 250 ml	5,000	5,000	**£188. 0. 0.**	*f*

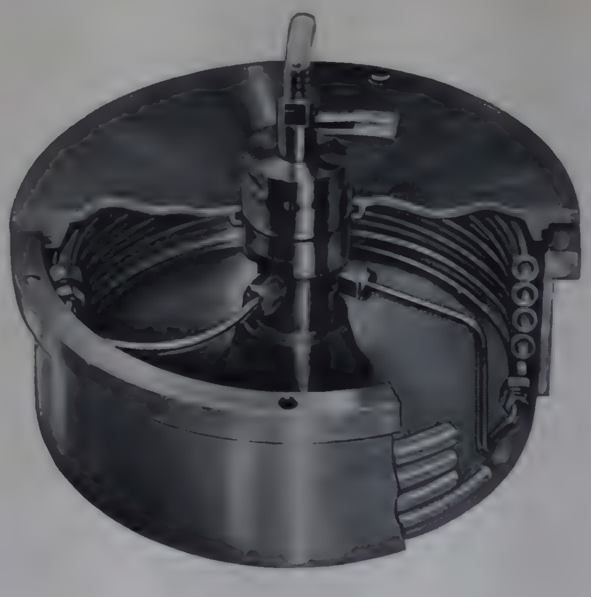
Import duty will be charged at the rate applicable at time of importation. Upon receipt of a Treasury Direction, import duty will be refunded when received from H.M. Customs and Excise.

For details of zonal heads see page 129. For suitable tubes and bottles see page 132.

HELIXTRACTOR ACCESSORY

- **Continuous flow separation of micro deposits**
- **No aeration of the fluid**
- **Will fit most I.E.C. centrifuges**
- **Very simply assembled**
- **May be autoclaved**

Suitable for centrifuges, models HT, CS, UV, PR-2, PR-6 and B-20. Fluid enters and leaves the extractor through two tubulures on the stationary central hub. Extraction takes place in the helix of transparent pvc or polythene tubing which rotates at up to 6000 rev/min (RCF=4000 g). Because a uniform flow rate and a constant acceleration are used, the separated solids tend to fractionate and individual fractions may be collected by cutting out the sections of tubing containing them. The solid extracts are recovered as a paste, using a roller type specimen extractor.



CH-245

*** CH-245**
HELIXTRACTOR, *International.* Full details on application on stating with which *International* centrifuge it is to be used.

INTERNATIONAL CENTRIFUGES

IEC
INTERNATIONAL CENTRIFUGE

CH-260

ULTRACENTRIFUGES

For density gradient and preparative techniques.

Model B-35

- **Speeds to 35,000 rev/min**
- **RCF values up to 206,000 g**
- **Operational vacuum below 0·05 torr**

Model B-60

- **Speeds to 60,000 rev/min**
- **RCF values up to 405,000 g**
- **Operational vacuum below 0·0005 torr**

Models B-35 and B-60 are similar in appearance and construction.

- **Extremely quiet running**
- **Programmed operation for runs of up to six hours**
- **Drive system self-balancing and continuously fed with cooling water and oil**
- **Solid state speed control gives uniform acceleration to preset speed**
- **Electronic control holds and indicates temperature to within ±1°C of set value from below 0°C to 20°C**
- **Total elapsed time displayed digitally**
- **150 litres/minute vacuum pump**

SAFETY FEATURES

- **Motor stopped if head rotates faster than its safe maximum speed or if oil, water or vacuum systems fail.**
- **Lid may not be opened before vacuum is released**
- **Vacuum chamber made from one inch thickness armour plate.**

PERFORMANCE AND OPERATION

Typical performance figures

Tubes	Speed rev/min	RCF × g
4 × 500 ml	14,000	28,500
8 × 55 ml	35,000	147,100
8 × 14 ml	35,000	109,300
	60,000 (B-60 only)	321,400

TECHNICAL DATA

Construction	Steel frame and panelling, with stainless steel centrifuge chamber and armour plate guard bowl.
Refrigerator motor rating	1/3 hp
Electric timer	0–6 hours in 10 minute steps
Electrical supply	210–260V 50 Hz single phase
Maximum load	30A
Cooling water requirements	1·9 litres/min
	H W D
Overall dimensions	99 ×115 × 76 cm

***CH-250**

ULTRACENTRIFUGE, *International* **MODEL B-35,** as specification with 1½ hp centrifuge motor and operating vacuum below 0·05 torr. **Without heads.** Net weight 573 kg ... ... Each **£2982. 0. 0.** f

***CH-260**

ULTRACENTRIFUGE, *International* **MODEL B-60,** as specification, with direct drive, geared 1¾ hp centrifuge motor, and with an additional silicone oil diffusion pump to provide an operating vacuum below 0·0005 torr. **Without heads.** Net weight 596 kg.
Each **£3637. 0. 0.** f

When ordering please state voltage and nature of supply.

Prices include delivery and installation but are exclusive of import duty. Import duty payable will be charged at the rate applicable at time of importation. Upon receipt of a Treasury Direction, import duty will be refunded when received from H.M. Customs and Excise.

HEADS FOR INTERNATIONAL ULTRACENTRIFUGES

MODELS B-35 AND B-60

All heads have an unlimited life and de-rating is unnecessary. Details of sizes and capacities are tabulated with maximum performance figures.

List No.	Type	Capacity ml	Model B-35		Model B-60		EACH	
			rev/min	RCF × g	rev/min	RCF × g		
***CH-262**	A321 fixed angle	8 × 14	35,000	109,300	60,000	321,400	**£255**. **0**. **0**.	*f*
***CH-264**	A211 fixed angle	8 × 40	35,000	127,800	45,000	211,200	**£244**. **0**. **0**.	*f*
***CH-266**	A170 fixed angle	6 × 90	35,000	130,400	40,000	170,300	**£259**. **0**. **0**.	*f*
***CH-268**	A147 fixed angle	8 × 55	35,000	147,100	35,000	147,100	**£222**. **0**. **0**.	*f*
***CH-270**	A90 fixed angle	16 × 55	25,000	90,100			**£278**. **0**. **0**.	*f*
***CH-272**	A57 fixed angle	6 × 280	19,000	57,000			**£297**. **0**. **0**.	*f*
***CH-274**	A28 fixed angle	4 × 500	14,000	28,500	14,000	28,500	**£237**. **0**. **0**.	*f*
***CH-276**	SB405 horizontal	6 × 4·2	35,000	138,000	60,000	405,900	**£893**. **0**. **0**.	*f*
***CH-278**	SB206 horizontal	6 × 14	35,000	206,200			**£818**. **0**. **0**.	*f*
***CH-280**	SB283 horizontal	6 × 14			41,000	283,200	**£684**. **0**. **0**.	*f*
***CH-282**	SB110 horizontal	6 × 40	25,000	110,000	25,000	110,000	**£480**. **0**. **0**.	*f*

All head prices include one set of aluminium tube caps and one case of Autoclear tubes but are exclusive of import duty. Head CH-272 includes six Teflon coated aluminium caps and six polypropylene bottles. Head CH-274 includes four caps and four polypropylene bottles.

ACCESSORIES FOR ULTRACENTRIFUGES

***CH-290**

TUBE PUNCTURING AND GRADIENT FRACTIONATING UNIT, for use with CH-250 and CH-260 and Autoclear plastics tubes. Comprising sample tube ice bath, fraction collector ice bath, puncturing needles, sealing discs and flow control. Without venting adapter ... ... Each **£130**. **0**. **0**. *f*

***CH-295**

VENTING ADAPTER AND ICE BATH ADAPTER, for 35 ml, 15 ml, 10 ml, 5 ml and 1 ml tubes. Details and prices on request.

NOTE: All prices are exclusive of import duty. Upon receipt of Treasury Direction, import duty will be refunded when received from H.M. Customs and Excise.

TUBES, BOTTLES AND CAPS FOR ULTRACENTRIFUGES

Because of the large number of combinations of tubes, bottles and caps available the customer is recommended either to state precise requirements or to ask for fully detailed lists of:

Autoclear, clear polycarbonate tubes.

Polythin, thin wall polypropylene tubes.

Oak Ridge, screw capped polypropylene or polycarbonate tubes.

ZONAL CENTRIFUGING

A technique which combines many of the advantages of both preparative and analytical centrifugation.

Zonal heads are hollow centrifuge rotors in which separation occurs as a result of the migration of narrow cylindrical zones of particles through a density gradient.

Two distinctly different kinds of separation can be achieved. Separation can occur on the basis of different sedimentation rates (rate zonal separation) and also on the basis of differences in densities (isopyknic separation).

***CH-330**

ZONAL HEAD, *International* **A-XII,** for use with CH-220. Capacity 1300 ml, speed 4500 rev/min, RCF 4000 g ... ... Each **£1688**. **0**. **0**. *f*

***CH-340**

ZONAL HEAD, *International* **Z-15,** for use with CH-225. Capacity 800 ml, speed 8000 rev/min, RCF 9100 g ... ... Each **£1819**. **0**. **0**. *f*

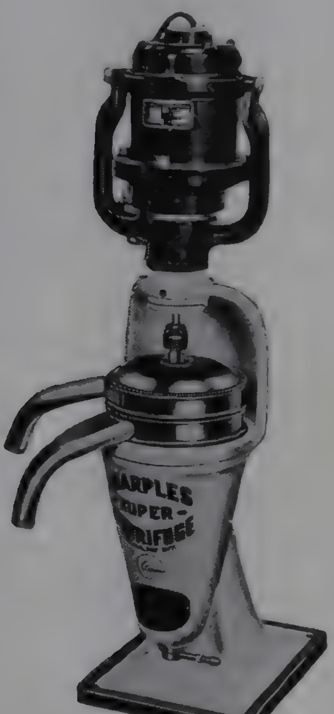
SHARPLES LABORATORY SUPER CENTRIFUGE

- **RCF up to 62,000 × g**
- **Turbine or electric motor drive**
- **Clarifier, separator or batch rotors**

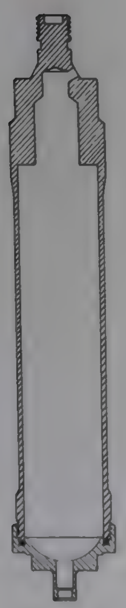
A high speed centrifuge specifically designed for work involving batch or continuous separations in medical and industrial laboratories of all types.

The basic types of separation which can be achieved are:

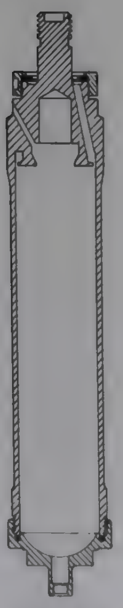
1. The recovery of solids from liquids.
2. The clarification of liquids.
3. The separation of two immiscible liquids.



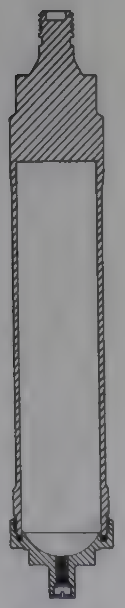
CH-800



CH-810



CH-812



CH-814

CONSTRUCTION

The centrifuge rotor is suspended from a turbine or electric driving motor by a flexible spindle and held in a loose-fitting guide bushing at the bottom. This system permits the rotor to assume a centre of rotation about its own centre of mass and thus reduces vibration to a minimum. The machine is fitted with a feed nozzle at the bottom and two separate discharge systems at the top for use during continuous separations. All components which come in contact with the sample material are made from stainless steel. The housing for the rotor, which incorporates the motor mounting and a support foot, is a robust iron casting finished in white enamel.

ROTORS

Three types of interchangeable rotor are available:

1. **Clarifier.** This has one outlet and is used for the removal of solids or small amounts of heavy liquid from a lighter liquid. The heavy material is retained in the rotor and removed at the end of the run.
2. **Separator.** This has two outlets and is used for the separation of mixtures or emulsions of immiscible liquids into their component parts. Heavy solids in suspension are retained in the rotor and removed at the end of the run.
3. **Batch.** This has no outlets and is for handling small amounts of liquid in a discontinuous manner, and for collecting small quantities of solids.

Type of drive	Electric motor	Turbine
Input requirements	200/250V a.c. single phase or d.c.	Steam, 100 lb/hr at 40 lb/in^2 OR Air, 30 ft^3/min at 40 lb/in^2
Maximum speed	23,000 rev/min	50,000 rev/min
Maximum RCF	13,000 × g	62,000 × g

CH-800

CENTRIFUGE, *Sharples* **laboratory type 1A,** as above specification, with **electric motor drive,** for 200/250V a.c. single phase or d.c. supplies. Complete with **batch rotor** and set of tools... Each **£351. 0. 0.** *f*

CH-801

CENTRIFUGE, as CH-800 but with **turbine drive.** Each **£351. 0. 0.** *f*

CH-802

CENTRIFUGE, *Sharples* **laboratory,** as CH-800 but with **clarifier rotor** ... ... Each **£357. 0. 0.** *f*

CH-803

CENTRIFUGE, as CH-802 but with **turbine drive.** Each **£357. 0. 0.** *f*

CH-804

CENTRIFUGE, *Sharples* **laboratory,** as CH-800 but with **separator rotor** ... ... Each **£377. 0. 0.** *f*

CH-805

CENTRIFUGE, as CH-804 but with **turbine drive.** Each **£377. 0. 0.** *f*

ACCESSORIES

CH-810	**Clarifier rotor**	Each £115. 0. 0.	*f*
CH-812	**Separator rotor**	Each £134. 0. 0.	*f*
CH-814	**Batch rotor**	Each £110. 0. 0.	*f*
CH-820	**Rheostat, for motor speed control.**	Each £25. 0. 0.	*f*

CENTRIFUGE TUBES

The design of centrifuges has evolved over many years in various different countries. In the absence of standard specifications, each manufacturer has developed his own range of tube and bottle sizes, few of which will fit machines of other makes. In 1953 *Gallenkamp* standards were altered to agree with those of *International* Equipment Company in the U.S.A. so that tubes for these machines are interchangeable. **All tubes and bottles listed are suitable for *Gallenkamp* and most *International* machines except high speed and ultra centrifuges.**

Dimensions are also shown on all illustrations, the diameters being 'maximum' and the lengths 'nominal' within normal manufacturing tolerances. **When ordering tubes for machines of other makes, please state internal diameter of bucket and any length limitations necessary to avoid fouling the centrifuge head. See Fitting Chart on page 116.**

Plastics tubes are specially recommended for use in high speed and angle heads where the fragility of glass may lead to undue breakage. They are also useful in medical and radiochemical laboratories where the contents may be dangerous or irreplaceable.

COREX Centrifuge Tubes are made in the U.S.A. from a special type of glass which is treated by an ion-exchange process to increase its strength and surface hardness. They withstand repeated steam sterilisation without visible clouding and may be used up to 300°C without damage. They are especially recommended for use where the safety of samples is an important consideration.

Low speed tubes are suitable up to 4500 g, medium speed tubes up to 15,000 g and the high speed tubes may safely be spun up to 40,000 g.

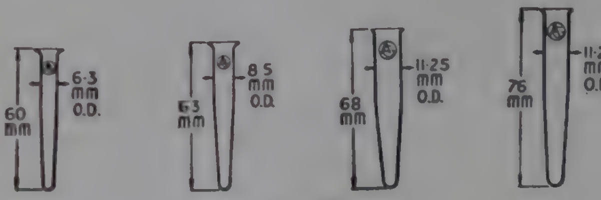
Any *Corex* centrifuge tube which becomes unserviceable in normal use within twelve months from date of purchase will be replaced free of charge.

POLYTHIN Centrifuge Tubes are transparent, thin walled polypropylene tubes which combine the flexibility of cellulose nitrate with the chemical stability of polypropylene. They are suitable for autoclave sterilisation and withstand up to 405,000 g in accessories designed to accomodate them.

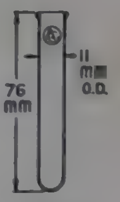
Fitting chart for tubes and buckets—see page 116.

CENTRIFUGE TUBES, 0·5 to 12 ml.

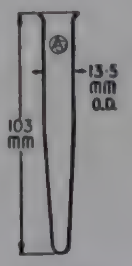
		Gross	Dozen	Each	
CJ-005	Borosilicate glass, micro, conical. To BS 1428, part E3 0·5 ml	220/–	20/–	—	a
	1 ml	220/–	20/–	—	a
	2 ml	230/–	21/–	—	a
	3 ml	230/–	21/–	—	a
***CJ-012**	Polypropylene, 3 ml cylindrical	—	28/–	3/10	m
CJ-015	Borosilicate glass, 5 ml conical	255/–	23/6	—	a
***CJ-024**	Polypropylene, 7 ml cylindrical	—	30/–	4/–	m
***CJ-035**	Polypropylene, 12 ml cylindrical	—	31/–	4/1	m
***CJ-038**	*Corex*, 12 ml conical, medium speed	—	Pack of 24 310/–	14/6	d



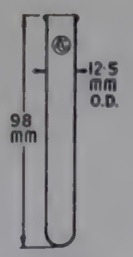
CJ-005



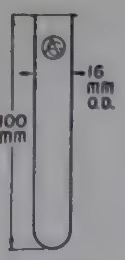
CJ-012



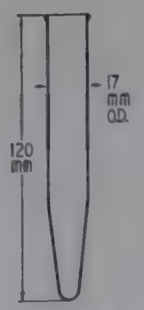
CJ-015



CJ-024



CJ-035

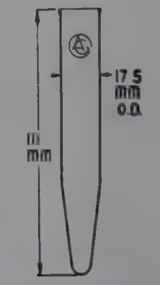


CJ-038

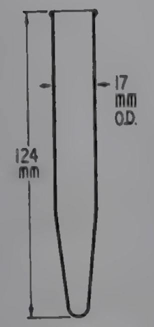
All items on this page normally available from stock.

CENTRIFUGE TUBES

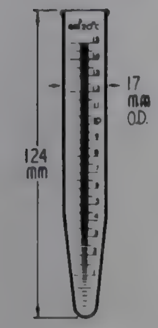
Fitting chart for tubes and buckets—see page 116.


17.5 mm O.D.
111 mm

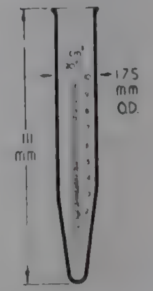
CJ-040
CJ-044


17 mm O.D.
124 mm

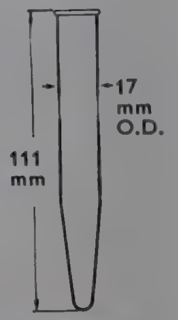
CJ-043


17 mm O.D.
124 mm

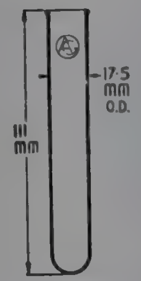
CJ-045


17.5 mm O.D.
111 mm

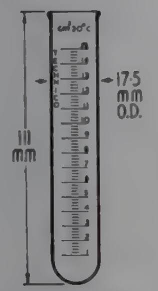
CJ-046


17 mm O.D.
111 mm

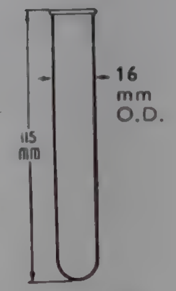
CJ-048


17.5 mm O.D.
111 mm

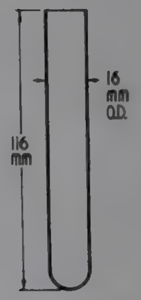
CJ-050


17.5 mm O.D.
111 mm

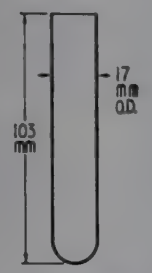
CJ-052


16 mm O.D.
115 mm

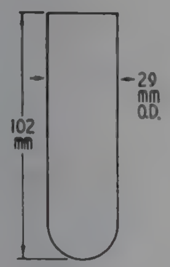
CJ-055


16 mm O.D.
116 mm

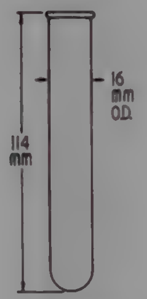
CJ-057


17 mm O.D.
103 mm

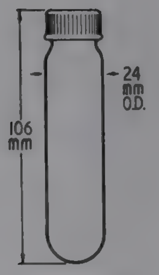
CJ-060


29 mm O.D.
102 mm

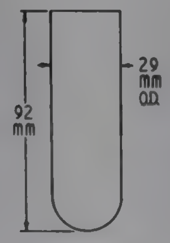
CJ-061


16 mm O.D.
114 mm

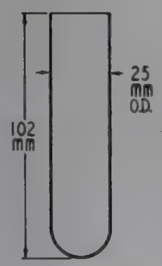
CJ-065


24 mm O.D.
106 mm

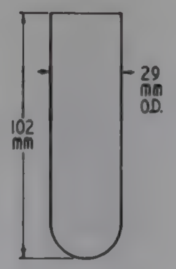
CJ-075


29 mm O.D.
92 mm

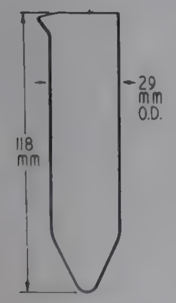
CJ-076


25 mm O.D.
102 mm

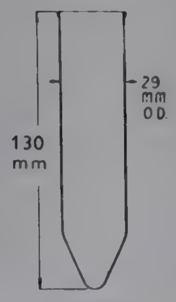
CJ-082


29 mm O.D.
102 mm

CJ-083


29 mm O.D.
118 mm

CJ-090


29 mm O.D.
130 mm

CJ-096

CENTRIFUGE TUBES, 15 ml.

		Gross	Dozen	Each	
CJ-040	Soda glass, conical	**114/-**	**10/3**	—	*a*
***CJ-043**	*Corex*, conical, low speed	Pack of 30 **240/-**	Pack of 6 **51/-**	**9/3**	*d*
CJ-044	Borosilicate glass, conical	Gross **215/-**	Dozen **19/6**	—	*a*
***CJ-045**	*Corex*, conical, graduated 15 cm³ in 0·1 cm³, low speed	Pack of 18 **490/-**	Pack of 6 **170/-**	**30/-**	*d*
CJ-046	*Pyrex brand* glass, conical, graduated 10 cm³ in 0·1 cm³	Pack of 48 **133/-**	Dozen **35/-**	**4/5**	*d*
CJ-048	Polypropylene, conical	Gross **110/-**	**10/-**	—	*c*
CJ-050	Soda glass, cylindrical	**114/-**	**10/3**	—	*a*
CJ-052	Soda glass, cylindrical, graduated 1 to 15 cm³ in 0·2 cm³	—	**62/-**	**6/4**	*a*
***CJ-055**	Polypropylene, cylindrical	—	**36/-**	**4/6**	*m*
***CJ-057**	*Corex*, cylindrical, rimless, low speed	Pack of 48 **195/-**	Pack of 6 **26/-**	**5/6**	*d*
***CJ-060**	*Corex*, cylindrical, rimless, high speed **NOTE:** For high speed usage CJ-060 must be used with CJ-061 in a larger bucket.	**195/-**	**26/-**	**5/6**	*d*
***CJ-061**	Rubber adapter for CJ-060	—	Dozen **140/-**	**12/9**	*d*

CENTRIFUGE TUBES, 20 to 45 ml.

		Gross	Dozen	Each	
***CJ-065**	*Polythin*, polypropylene, 20 ml, cylindrical	—	**30/-**	**4/-**	*c*
***CJ-075**	*Corex*, 25 ml, cylindrical with screw cap, high speed **NOTE:** For high speed usage CJ-075 must be used with CJ-076 in a larger bucket.	—	**330/-**	**30/-**	*d*
***CJ-076**	Rubber adapter for CJ-075	—	**145/-**	**13/3**	*d*
***CJ-082**	*Corex*, 30 ml, cylindrical rimless, high speed **NOTE:** For high speed usage CJ-082 must be used with CJ-083 in a larger bucket.	Pack of 36 **220/-**	Pack of 6 **39/-**	**7/6**	*d*
***CJ-083**	Rubber adapter for CJ-082	—	Pack of 12 **145/-**	**13/3**	*d*
***CJ-090**	*Corex*, 40 ml, conical, low speed, with pouring lip	—	**235/-**	**21/6**	*d*
***CJ-096**	Polypropylene, 45 ml conical	—	Dozen **66/-**	**6/8**	*m*

All items on this page normally available from stock.

CENTRIFUGE TUBES AND BOTTLES

Fitting chart for tubes and buckets—see page 116.

CENTRIFUGE TUBES, 50 ml.

			Dozen	Each	
CJ-100	Soda glass, conical		**26/6**	**3/9**	*a*
CJ-102	Soda glass, conical, graduated 50 cm^3 in 1 cm^3		**110/–**	**10/–**	*a*
***CJ-110**	*Corex*, conical, low speed	Pack of 30 **400/–**	Pack of 6 **85/–**	**15/–**	*d*
***CJ-112**	*Corex*, conical, graduated to 10 cm^3 in 0·5 cm^3 and to 50 cm^3 in 1 cm^3, low speed	Pack of 12 **400/–**	**205/–**	**36/–**	*d*
CJ-120	Soda glass, cylindrical		Dozen **23/–**	**3/6**	*a*
CJ-122	Soda glass, graduated, cylindrical 50cm^3 in 1cm^3		**108/–**	**10/–**	*a*
CJ-124	Borosilicate glass, cylindrical		**27/–**	**3/9**	*a*
CJ-126	Soda glass, narrow neck cylindrical		**27/–**	**3/9**	*a*
CJ-138	Polypropylene, rimless		**27/–**	**3/9**	*c*
***CJ-140**	*Polythin*, polypropylene, cylindrical		**27/6**	**3/10**	*c*
***CJ-150**	*Corex*, cylindrical with screw cap, low speed		**390/–**	**36/–**	*d*

CENTRIFUGE TUBES, 100 ml cylindrical.

		Dozen	Each	
CJ-160	Borosilicate glass, with lip	**50/–**	—	*m*
***CJ-172**	Polypropylene	**102/–**	**9/6**	*m*
***CJ-175**	*Polythin*, polypropylene	**70/–**	**7/–**	*c*

CENTRIFUGE BOTTLES

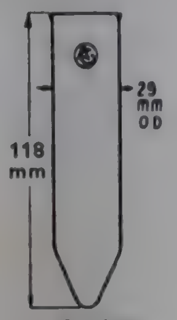
		Gross	Pack of 6	Each	
***CJ-190**	*Corex*, 150 ml with polypropylene screw cap, medium speed **NOTE:** CJ-190 must be used with adapter CJ-191 in a larger bucket.	—	**430/–**	**76/–**	*d*
***CJ-191**	Rubber adapter for CJ-190	—	**190/–**	**34/–**	*d*
***CJ-192**	Polypropylene screw cap spare for CJ-190	**104/–**	Dozen **9/6**	—	*d*
CJ-210	*Pyrex brand* glass, 210 ml, with neck	Pack of 24 **115/–**	**59/–**	**6/2**	*d*
***CJ-212**	Polypropylene, 250 ml, with screw cap	—	—	**11/6**	*m*

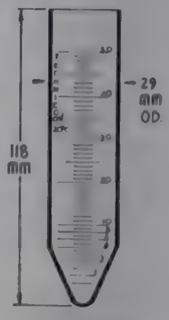
SPECIAL PURPOSE TUBES

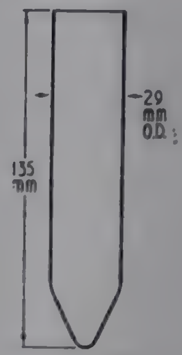
CJ-220

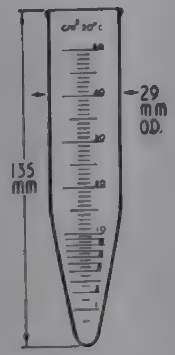
CENTRIFUGE TUBE, Hopkins vaccine, graduated 0 to 0·05 in 0·01 cm^3 and marks at 1, 5 and 10 cm^3.
Dozen **£6. 10. 0.** Each **£0. 11. 9.** *a*

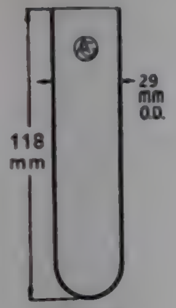
MC-700 **WINTROBE TUBE** to BS 2554.
PH-912 **WATER and SEDIMENT TUBE** to IP 75 ... ...
} For details see entries in List No. sequence.

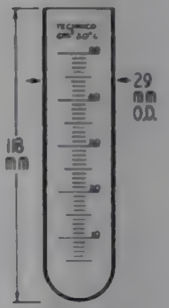

118 mm
29 mm OD
CJ-100

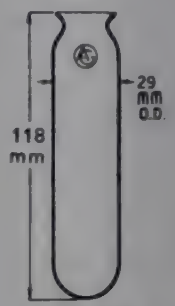

118 mm
29 mm OD.
CJ-102

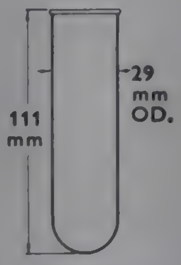

135 mm
29 mm O.D.
CJ-110

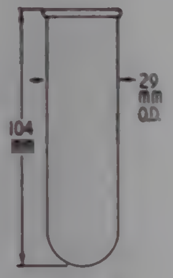

cm³ 20°C
135 mm
29 mm OD.
CJ-112

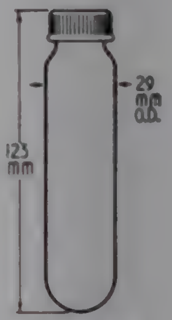

118 mm
29 mm OD.
CJ-120
CJ-124

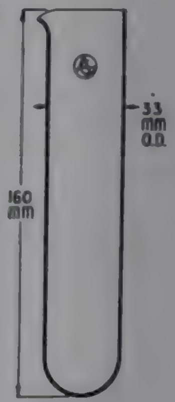

118 mm
29 mm OD.
CJ-122

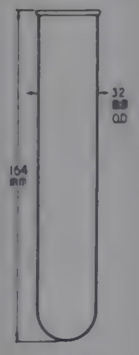

118 mm
29 mm OD.
CJ-126

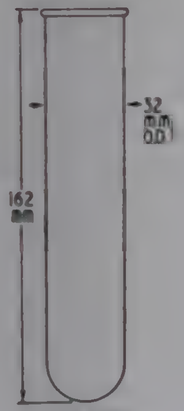

111 mm
29 mm OD.
CJ-138

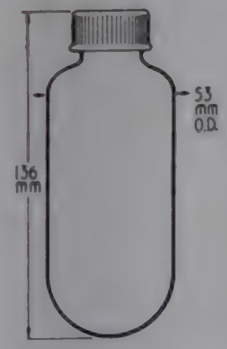

104 mm
29 mm OD.
CJ-140

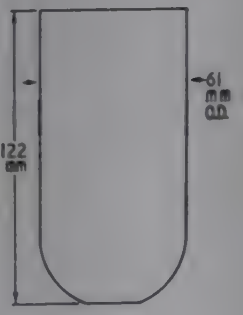

125 mm
29 mm OD.
CJ-150

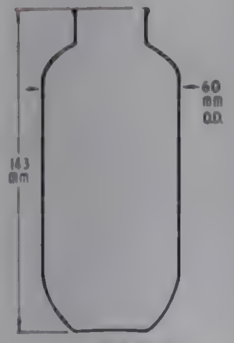

160 mm
33 mm OD.
CJ-160

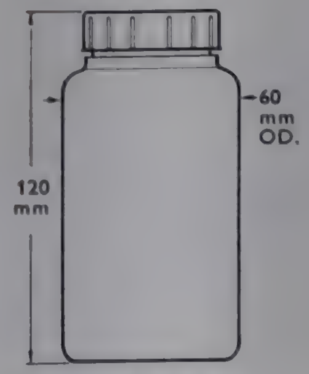

164 mm
32 mm OD
CJ-172

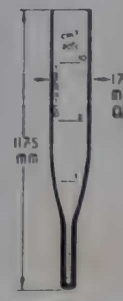

162 mm
32 mm OD.
CJ-175


136 mm
53 mm OD.
CJ-190


122 mm
61 mm OD.
CJ-191


143 mm
60 mm OD.
CJ-210


120 mm
60 mm OD.
CJ-212


cm³ 20°C
1175 mm
175 mm OD.
CJ-220

All items on this page normally available from stock.

RUBBER CUSHIONS

For Gallenkamp and *International* CENTRIFUGES

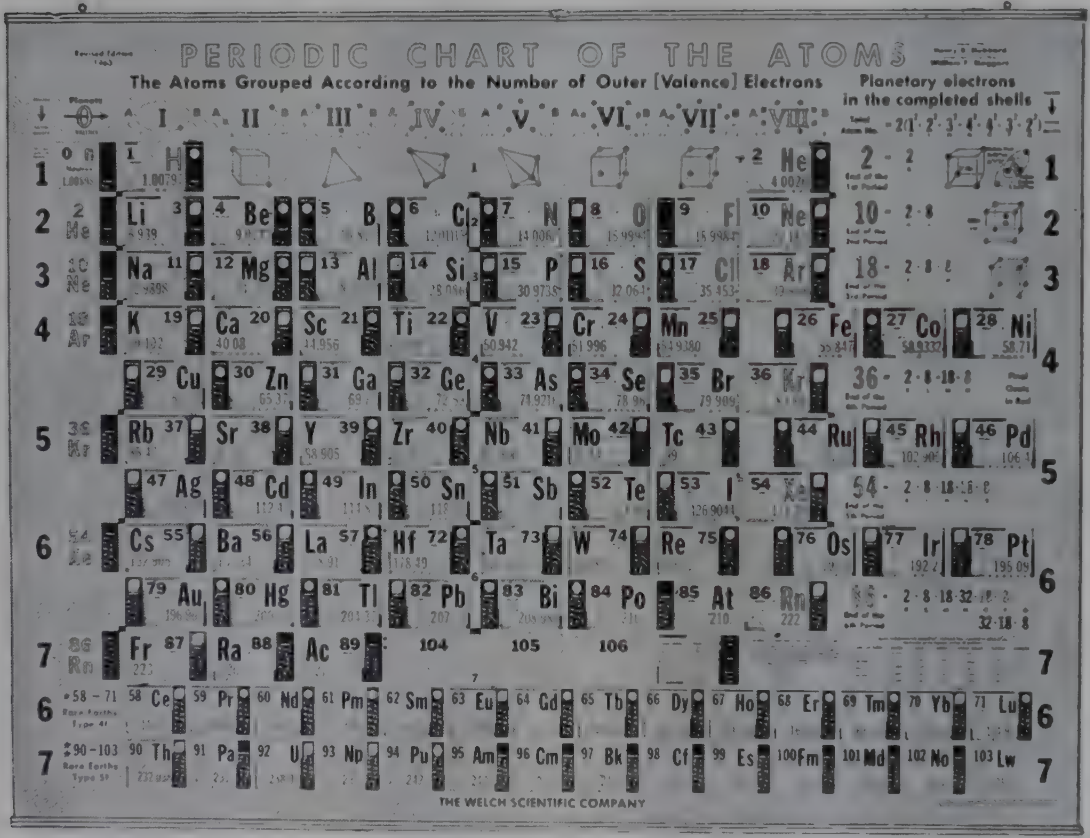
		Dozen	Each	
CJ-305	For 15 ml short buckets CF-450 and CF-452	**10/-**	—	c
CJ-310	For 15 ml long buckets CF-670 and CF-672	**11/-**	—	c
CJ-320	For 50 ml buckets when using round bottom tubes	**14/-**	—	c
CJ-330	For 50 ml buckets when using short conical tubes CJ-100 and CJ-102 only	**17/-**	**3/-**	c
CJ-340	For 100 ml buckets	**18/-**	**3/1**	c
CJ-350	For 250 ml buckets	**43/-**	**5/-**	c

EBONITE ADAPTERS

For Gallenkamp CENTRIFUGE BUCKETS

		Pair	
CJ-402	For using tubes CJ-005 and CJ-012 in 15 ml buckets. Supplied in balanced pairs	**22/-**	*b*
CJ-410	For using 5 ml tubes CJ-015 in 15 ml buckets. Supplied in balanced pairs	**14/-**	*b*
CJ-420	For using Wintrobe tube MC-700 in 15 ml buckets. Supplied in balanced pairs	**14/-**	*b*
CJ-430	For using 15 ml tubes in 50 ml buckets. Supplied in balanced pairs	**25/-**	*b*

Fitting chart for tubes and buckets—see page 116.

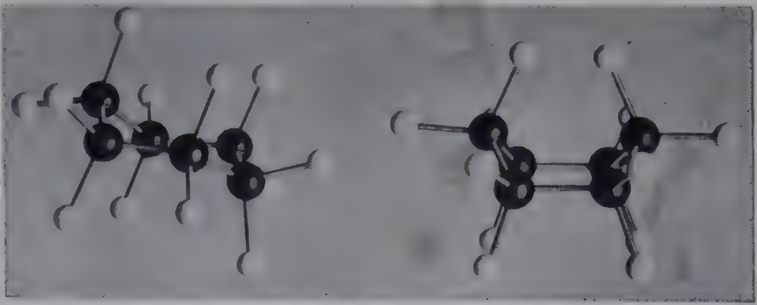

PERIODIC CHART OF THE ATOMS
The Atoms Grouped According to the Number of Outer (Valence) Electrons
Planetary electrons in the completed shells
THE WELCH SCIENTIFIC COMPANY

CJ-900

CHARTS

***CJ-900**

PERIODIC CHART of the ATOMS, Meggers, originally designed by H. D. Hubbard of the American National Bureau of Standards. A large multi-coloured chart, 110 × 150 cm wide, printed on heavy paper finished with matt plastics protective surface, with metal rims at top and bottom and eyelets for hanging. Clearly presents the principal facts of all known elements and their atoms; recently discovered transuranic elements are included. In each case atomic number, atomic weight and symbol are shown in large display type, and in most cases some thirty other items of information are given. The chart is supplied with a 48-page explanatory booklet containing further useful information ... Each **£6. 10. 0.** c



Cyclohexane

Versatile Molecular Models for:

- Inorganic Chemistry
- Organic Chemistry
- Crystallography

See MV-800 to MV-860 in List No. sequence.

All items on this page normally available from stock.

CHROMATOGRAPHY

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PAPER CHROMATOGRAPHY

Gallenkamp CIRCULAR CHROMATOGRAPHY CELL

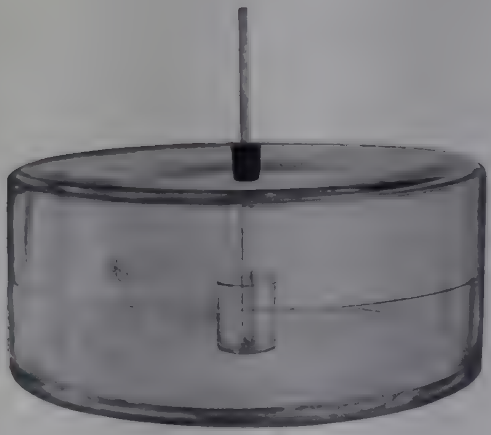
CHROMATOGRAPHY CELL, circular pattern, after the design of G. Wolf (Naturwissenschaften, **43,** 1956, 422).

Two cylindrical glass troughs 30 cm dia. × 7 cm high have ground rims and form a gas tight enclosure when mounted rim to rim. A solvent container stands on the ground region which is in the middle of the lower trough. The container has a vertical capillary stem fused to the centre of its base with solvent entry ports surrounding the join. The top of the capillary is level with the rim of the lower trough. The upper trough has a centre hole into which is fitted a glass tube by means of a rubber stopper.

A supply of solvent is placed in the container in the lower tank and a filter paper disk already dotted with samples is placed so that it is supported at the centre by the capillary and at the circumference by the rim of the trough. The upper trough is mounted and the cell left for the atmosphere to reach equilibrium.

The run is started by lowering the glass tube until it meets the paper directly above the capillary. Applying gentle suction to the glass tube, draws solvent up the capillary into contact with the paper, after which it continues to flow automatically.

Due to the uniformity of conditions in the cell the spots are found to remain very compact and well defined. Reproducibility is good because of the constant feed rate ensured by the capillary. Up to 12 spots can be used at a time as they separate more as they move outwards.


CK-100

CK-100

CHROMATOGRAPHY CELL, circular pattern, as specification ... ... Each **£11. 5. 0.** *a*

REPLACEMENT PARTS

CK-102	Lower vessel, with ground surface.	Each	£5. 2. 0.	*a*
CK-104	Upper vessel, with centre hole ...	Each	£5. 2. 0.	*a*
CK-106	Solvent container, with capillary.	Each	£0. 16. 0.	*a*

All items on this page normally available from stock.

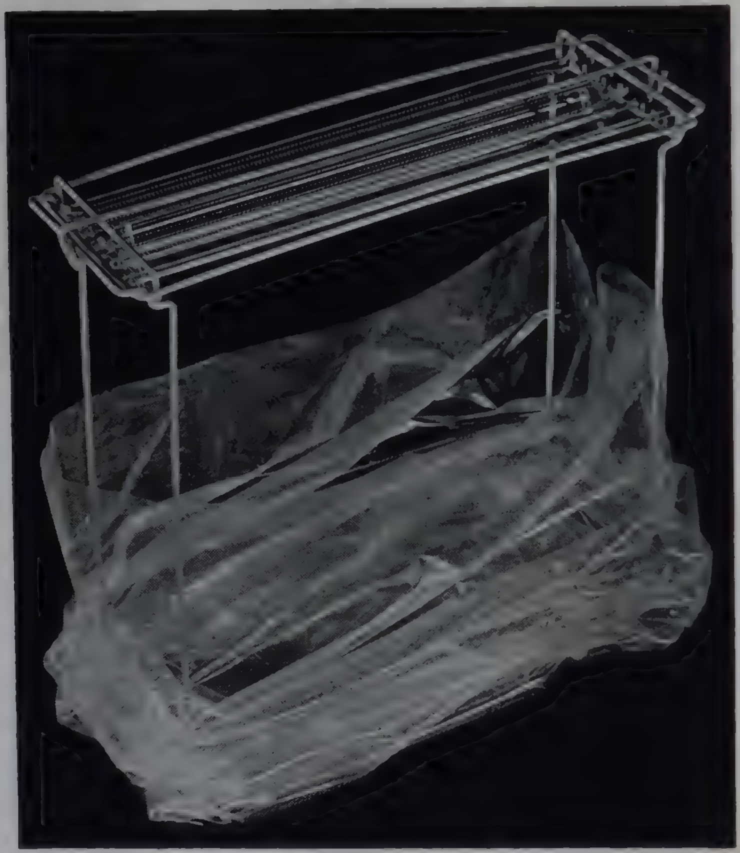
Gallenkamp CHROMATOBAGS

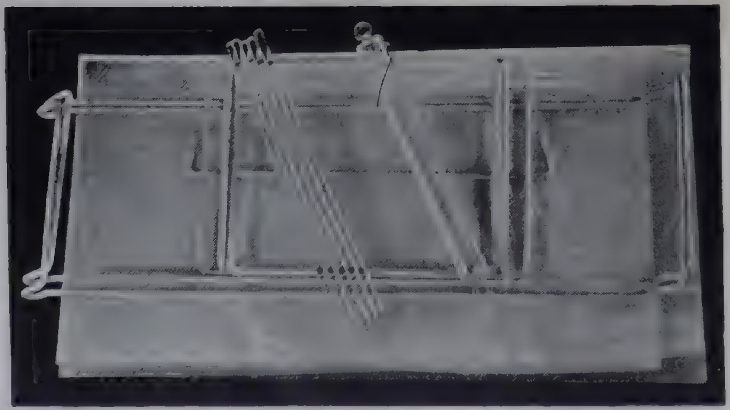
FULL SIZE CHROMATOGRAPHY TANKS WHICH CAN BE FOLDED UP AND STORED IN A SMALL SPACE

- **Unbreakable transparent containers—disposable when contaminated**
- **Light, strong—low carriage costs**
- **Airtight, resistant to all common solvents**
- **Quick-strip framework**
- **Complete accessibility to chromatograms**
- **Especially suitable for radioactive work**

It is frequently necessary to exclude wood and metals from paper chromatography apparatus, and glass tanks are consequently widely used.

The disadvantages of heavy, fragile glass tanks are obvious; they are expensive to transport and their storage and cleaning can present a real problem in laboratories using them in large numbers.





CK-150

Unbreakable fold-away **Chromatobags** overcome these disadvantages. Much less expensive than their glass counterparts, they offer an ideal system for both the occasionable chromatographer and the busy routine analyst.

A **Chromatobag** consists of a readily demountable plastics-coated framework which supports the solvent trough and the guide rods for the paper strips or sheets. A tough flexible plastics bag draws up over this frame to form a 'tank' and the enclosure is rendered airtight by clipping the neck of the bag.

To replenish the trough or remove the chromatograms, the bag is opened and, if necessary, slipped down over the framework.

Chromatograms may be inspected through the transparent sheet at any time during their development.

DESIGN FEATURES

The design does not necessitate any special chromatography techniques, but rather simplifies procedure by enabling the user to reach wet chromatograms from the side instead of from the top. They can be used equally satisfactorily for descending, ascending or two-dimensional work using paper strips or sheets. When the bags become old, soiled or contaminated with toxic chemicals, they can be replaced very easily and their destruction presents no problem.

DIMENSIONS

List No.		**CK-120** (small)	**CK-150** (large)
Length of trough		22	49 cm
Capacity of solvent trough		50	250 ml
Length of paper strip, max.		46	46 cm
Overall dimensions of assembled Chromatobag			
	H	55	55 cm
	W	32	59 cm
	D	20	20 cm

CK-120

CHROMATOBAG, *Gallenkamp*, **small size,** as specification, comprising plastics covered collapsible frame, plastics trough, set of glass guide rods, 3 plastics bags and full assembly instructions.

Dozen **£64. 0. 0.** Each **£5.16. 0.** *b*

REPLACEMENT PARTS

CK-122 **Plastics bags, for CK-120.**
Gross **£17. 0. 0.** Dozen **£1.11. 0.** c

CK-150

CHROMATOBAG, *Gallenkamp*, **large size,** otherwise as CK-120 above.

Dozen **£84. 0. 0.** Each **£7.15. 0.** *b*

REPLACEMENT PARTS

CK-152 **Plastics bags, for CK-150.**
Gross **£24. 0. 0.** Dozen **£2. 4. 0.** c

All items on this page normally available from stock.

CHROMATOGRAPHY TANKS

CHROMATOGRAPHY TANKS, all glass. *Panglas* **Chromatanks,** for ascending, descending and two-dimensional paper chromatography when solvent vapours preclude the use of metal or other corrodible materials. These tanks are press moulded with recessed shoulders for the twin solvent troughs and glass support rods. Additional recesses are provided for rods over which paper sheets may be draped to accelerate equilibration. The rims and plate glass covers are ground to provide an airtight fit with greasing and the covers are drilled with two solvent filling holes.

CK-180

CHROMATANK, *Panglas,* as specification, internal dimensions 30 × 20 × 56 cm high. Includes two glass troughs with 29 cm useable length, two glass anchor rods, four anti-siphon glass rods, two drape paper rods, glass cover and twelve plastics stoppers. Each **£22. 0. 0.** *f*

CK-182

CHROMATANK, *Panglas,* as CK-180 but internal dimensions 51 × 20 × 56 cm high and with troughs having 50 cm useable length ... ... Each **£29. 0. 0.** *f*

REPLACEMENT PARTS

CK-187	**Trough, for CK-180**	Each	**£1.15. 0.**	*f*
CK-188	**Trough, for CK-182**	Each	**£2.15. 0.**	*f*

OV-880

DRYING OVEN, *Gallenkamp,* dual purpose for drying chromatography paper or laboratory glassware. A removable rack accommodates up to six full size paper sheets at one time.
For price and details see entry in List No. sequence.

CK-280

HOT AIR BLOWER, portable, for general drying purposes including chromatography papers. Output 300 litres/min air at 95°C. Blower incorporates a 50W universal motor and a 500W heating element with interlocking safety switches for hot or cold air. Complete with 3-core mains lead.

For 200/250V a.c. supplies	Each	**£7.19. 6.**	*m*
For 100/110V a.c. supplies	Each	**£9.10. 6.**	*mN*

CK-300

DRYING CLIPS, stainless steel, with white plastics label, for holding chromatography paper when drying.
Gross **£17.10. 0.** Dozen **£1.12. 0.** *c*

CK-318

ALL-GLASS SPRAY, for producing a fine even aerosol of chromatography reagents and dyes. Consisting of spray head, 100 ml conical flask, rubber blowball and two spring connectors ... ... Each **£3.15. 0.** *c*

REPLACEMENT PARTS

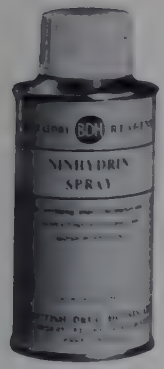
CK-320	**Spray head, with 24/29 cone** ...	Each	**£2.10. 0.**	*c*
CK-322	**Flask, 100 ml, with horns**	Each	**£0.10. 9.**	*a*
JR-140	**Spring connectors, 38 mm, stainless steel.**	For prices see entries in List No. sequence.		
RV-050	**Blowball, with reservoir, size No. 4.**			

CK-180

CK-280

CK-300

CK-318



CK-330

CK-330

NINHYDRIN AEROSOL DISPENSER, *BDH,* for conveniently spraying and developing amino acid paper chromatograms. Contains 120 ml 0·5% solution of indane-trione hydrate in n-butanol, sufficient for approximately twenty-five 25 × 25 cm paper chromatograms. Should be applied in a fume cupboard, or spray booth, holding the container about 15 cm from the paper.
Dozen **£5.17. 0.** Each **£0.12. 6.** *m*

Items on this page normally available from stock except those coded *N.*

CK-350

CK-350

CHROMATOGRAPHY SPRAY BOOTH, for use when spraying chromatograms with noxious or objectionable developing aerosols. Excess spray is contained by the polypropylene walls of the booth and is washed to drain by a water curtain which streams down the inner surface of the back wall. The booth may be used either on an open bench or in a fume cupboard. With 2 cm outside dia. water inlet tubulure, 4 cm outside dia. drain tubulure and a glass rod to support chromatography paper.

Overall dimensions 53 × 67 × 72 cm high.

Maximum size of paper which can be used 57 × 54 cm.

Each **£25. 0. 0.** *m*

WHATMAN PAPERS FOR CHROMATOGRAPHY

A range of specially prepared papers for chromatographic and electrophoretic separations, available in sheets and rolls. Other grades of paper and sizes are available to order.

CK-500

CHROMATOGRAPHY TRIAL PACKET, containing a selection of the popular chromatographic grades of paper ... ... Free of charge

CK-510

CHROMATOGRAPHY PAPER, Grade 1, for qualitative work in one and two dimensional separations. With a medium flow rate. Supplied in packets of 100 sheets.

Size	46 × 57	58 × 68 cm	
Pkt.	**£1. 16. 6.**	**£2. 14. 0.**	*d*

CK-515

CHROMATOGRAPHY PAPER, Grade 1, as CK-510, but supplied in 100 metre rolls 5 cm wide.
Roll **£0. 7. 8.** *d*

CK-525

CHROMATOGRAPHY PAPER, Grade 3, a rough thick paper with a medium flow rate, suitable for inorganic and electrophoretic separations. Supplied in packets of 100 sheets.

Size	46 × 57	58 × 68 cm	
Pkt.	**£4. 11. 0.**	**£6. 12. 0.**	*d*

CK-530

CHROMATOGRAPHY PAPER, Grade 3MM, a soft smooth, thick paper, suitable for inorganic separations and where large quantities of test solution are to be analysed. Supplied in packets of 100 sheets.

Size	46 × 57	58 × 68 cm	
Pkt.	**£3. 14. 0.**	**£5. 10. 0.**	*d*

CK-535

CHROMATOGRAPHY PAPER, Grade 3MM, as CK-530, but supplied in 100 metre rolls 5 cm wide.
Roll **£0. 13. 1.** *d*

CK-540

CHROMATOGRAPHY PAPER, Grade 4, a faster running paper than Grade 1 but of the same thickness. Ensures fast development times when using slow running solvents and suitable for the analysis of amino acids and sugars. Supplied in packets of 100 sheets.

Size	46 × 57	58 × 68 cm	
Pkt.	**£2. 19. 0.**	**£4. 9. 0.**	*d*

CK-545

CHROMATOGRAPHY PAPER, Grade 4, as CK-540, but supplied in 100 metre rolls 5 cm wide.
Roll **£0. 9. 1.** *d*

CK-560

CHROMATOGRAPHY PAPER, Grade 20, a paper with a very slow flow rate producing even, compact spots of most types of compounds. Supplied in 100 metre rolls 5 cm wide ... ... Roll **£0. 9. 6.** *d*

CK-580

CHROMATOGRAPHY PAPER, Grade 54, a hardened version of Grade 4, of high wet strength. Suitable for two dimensional chromatographic separations of sugars. Recommended for impregnation with absorbents such as alumina, starch and magnesia. Supplied in packets of 100 sheets, 46 × 57 cm ... Pkt. **£6. 6. 0.** *d*

CK-660

CHROMEDIA GF-81, a 100% glass fibre paper for chromatography and electrophoresis. Supplied in packet of 25 sheets 46 × 57 cm ... ... Pkt. **£4. 17. 0.** *m*

CK-662

CHROMEDIA GF-82, as GF-81 but a thick paper for larger scale separations. Supplied in packet of 25 sheets 46 × 57 cm ... ... Pkt. **£13. 15. 0.** *m*

CK-664

CHROMEDIA GF-83, as GF-81 but made from finer fibres to produce a more even pore distribution. Supplied in packet of 25 sheets 46 × 57 cm ... Pkt. **£8. 12. 0.**
For other Whatman Chromedia see page 141. *m*

All items on this page normally available from stock.

THIN LAYER CHROMATOGRAPHY

CK-750

T.L.C. DEMONSTRATION KIT, *Quickfit* **No. 9CR,** for use in educational establishments for demonstration purposes. Also useful in industrial laboratories carrying out preliminary investigations. The spreader coats both sizes of glass plates with an absorbent layer either 0·25 mm or 0·5 mm thick. The general purpose spray can be operated by any low pressure air source (e.g. the mouth, air lines, etc.). Reagents are in contact only with glass and PTFE.

Quantity	Ref. No.	Description
1	CR7/1A	Aluminium plate support
1	CR7/2A	Aluminium spreader
72	CR7/8	Glass spotting tube
72	CR9/2½	Glass plate, 7·5 × 2·5 cm
6	CR9/15	Glass plate, 15 × 7·5 cm
1	7CR	Spray, complete

Each **£12. 4. 0.** *m*

NOTE: Replacement plates can only be supplied in pack quantities as listed below under CK-795.

CK-780

T.L.C. APPARATUS, *Quickfit* **No. 8CR.** A complete outfit for carrying out thin layer chromatography experiments quickly, economically, and accurately. The outfit is designed for use with glass plates 20 × 20 cm which can be processed in batches of five. The spreader has four accurately machined slots for coating plates with absorbent layers 0·25, 0·5, 0·75 and 1·0 mm thick. The plastics spotting template is notched for sample application points 10 and 15 mm apart, and is ruled at 5 mm intervals for measuring Rf values on developed plates. The spray is that described under CK-750.

Outfit comprises:

Quantity	Ref. No.	Description
1	CR7/1	Automatic plate leveller
1	CR7/2	Spreader
2	CR7/3	Plate rack for plates 20 × 20 cm
1	CR7/4	Spotting template
1	CR7/5	Scriber
2	CR7/6	Developing tank/desiccator
2	CR7/7	Tank lid
2	CR8/5	Glass plate, 20 × 5 cm
2	CR8/10	Glass plate, 20 × 10 cm
10	CR8/20	Glass plate, 20 × 20 cm
1	7CR	Spray, complete
1	PM5/1	Micropipette, 0·005 ml subdivided 0·001 ml
1	PM10/2	Micropipette, 0·010 ml subdivided 0·0025 ml
1		Sample pack of Chromedia cellulose powder CC41

Each **£58.12. 0.** *m*

NOTE: Replacement plates can only be supplied in pack quantities as listed below under CK-795.

CK-790 **REPLACEMENT PARTS,** basic components for CK-750 and CK-780.

Ref. No.	Description		Price	
CR7/1	Automatic plate leveller	Each	**£29. 0. 0.**	*mN*
CR7/1A	Plate support	Each	**£5.10. 0.**	*mN*
CR7/2	Spreader for CR7/1	Each	**£6.10. 0.**	*mN*
CR7/2A	Spreader for CR7/1A	Each	**£4. 0. 0.**	*mN*
CR7/3	Plate rack for plates 20 × 20 cm ...	Each	**£4. 4. 0.**	*mN*
CR7/4	Spotting template	Each	**£2.10. 0.**	*mN*
CR7/6	Developing tank/desiccator ...	Each	**£5. 0. 0.**	*mN*

CK-795 **REPLACEMENT PARTS,** expendable components for CK-750 and CK-780.

Ref. No.	Description		Price	
CR7/5	Scriber	Each	**£0. 5. 0.**	*m*
CR7/7	Tank lid	Each	**£0.12. 6.**	*m*
63 CR	Plate CR9/15, 15 × 7·5 cm ...	Pack of 20	**£1. 8. 0.**	*m*
82 CR	Plate CR8/5, 20 × 5 cm ...	Pack of 20	**£2. 5. 0.**	*m*
84 CR	Plate CR8/10, 20 × 10 cm ...	Pack of 20	**£2 16. 0.**	*m*
88 CR	Plate CR8/20, 20 × 20 cm ...	Pack of 10	**£1.14. 0.**	*m*
PM5/1	Micropipette, 0·005 ml	Each	**£0.13. 0.**	*m*
PM10/2	Micropipette, 0·010 ml	Each	**£0.13. 0**	*m*
7 CR	Spray, complete	Each	**£2. 2. 9**	*m*
CR7/9	Spray, head only	Each	**£0.18. 0.**	*m*

CK-750

NOTE: Items shown on this page do **NOT** qualify for *Quickfit* order value discounts shown under conditions of sale at beginning of catalogue.

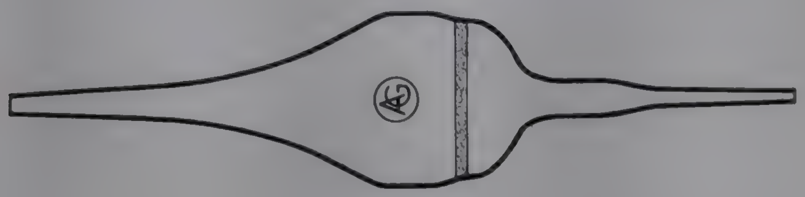
CK-780

REPLACEMENT PARTS, for CK-750 and CK-780, which will be found in other sections of this catalogue.

Ref. No.	Description	
Q-ST 52/18	Screw cap adapter for spray	For prices see entries in Quickfit Section
Q-FE 100/2	Spray, flask only ...	
HJ-720	Plates 75 × 25 × 1·0/1·2 mm, nominal thickness, as CR9/2½	For prices see entries in List No. sequence.
CL-284	Chromedia cellulose powder CC41	
MF-388	Capillary spotting tubes, as CR7/8	

Items on this page normally available from stock except those coded *N.*

THIN LAYER CHROMATOGRAPHY



CK-850

CK-850

SPOT COLLECTOR FUNNEL AG. An aerodynamically shaped bulb in borosilicate glass with a porosity No. 3 fritted disk sealed across the centre. A vacuum line is attached to one end of the bulb and the other end is used, rather like a pen, to scrape the spot from the plate. The powder is sucked into the collector and deposited on the fritted disk. After removing the air line, the powder can be rinsed out into a suitable container for UV or spectrophotometric analysis. Overall length 20 cm, plate diameter 40 mm ... Each **£2. 17. 0.** *a*

COLUMN CHROMATOGRAPHY

AG CHROMATOGRAPHY COLUMNS

Regd.

CL-100

CHROMATOGRAPHY COLUMNS, AG **borosilicate glass.** A range of glass columns for gravity elution. Each column is fitted with a fritted glass support disk of No. 1 porosity at the lower end, and has a 19/26 socket with spring hooks for dropping funnels to be attached.

Length Dia.	40 1·0	40 2·0	40 3·0	80 cm 2·0 cm	
Dozen	**350/-**	**410/-**	**500/-**	**590/-**	*a*
Each	**32/-**	**37/-**	**45/-**	**53/-**	

CL-102

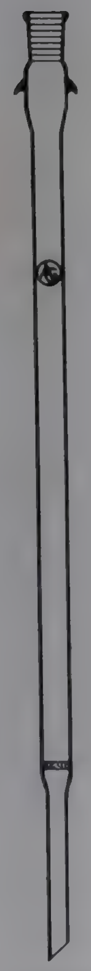
CHROMATOGRAPHY COLUMN, AG **borosilicate glass,** as CL-100, length 40 cm, dia. 3 cm **but with a fused on water jacket** ... ... Each **£5. 0. 0.** *a*

CL-120

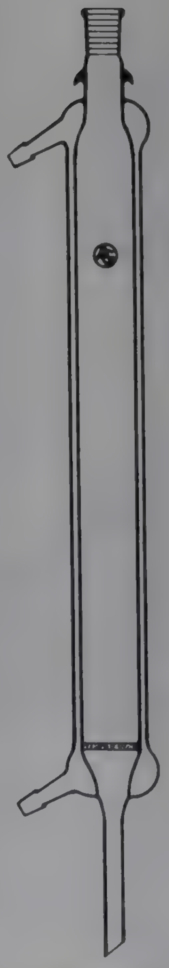
CHROMATOGRAPHY COLUMN, AG **borosilicate glass,** for gravity elution. Surmounted by a 50 ml reservoir with a 14/15 socket for ground glass stopper and having a straight-bore stopcock. Int. dia. 10 mm, length 18 cm.
Dozen **£25. 0. 0.** Each **£2. 5. 0.** *a*

CL-130

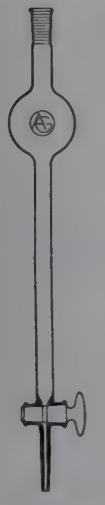
CHROMATOGRAPHY COLUMN, AG **borosilicate glass,** for suction elution, particularly suitable for separations of methylated oestrogens. Surmounted by a 40 ml reservoir and with a fritted disk, porosity 4, fused into the lower end to support the column packing. A 19/26 cone with pump connection surrounds the delivery tube and allows the elutriate to be collected in flasks having 19/26 sockets. Int. dia. 10 mm, length 50 mm. Dozen **£25. 0. 0.** Each **£2. 5. 0.** *a*



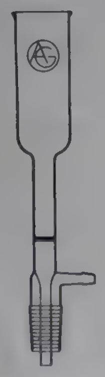
CL-100



CL-102



CL-120



CL-130

Quickfit chromatography columns see listing under
QUICKFIT APPARATUS

All items on this page normally available from stock.

MATERIALS FOR THIN LAYER AND COLUMN CHROMATOGRAPHY

WHATMAN CHROMEDIA

A series of materials for liquid-solid chromatography and ion exchange techniques. All powders are manufactured to give maximum uniformity in column packing. CL-284 has been developed for thin layer chromatography to form coherent layers without the addition of binding agents.

POWDER

List No.	Material	Form	Reference No.	Nominal exchange capacity meq/g	PRICE		
					100 g	500 g	
CL-260	Fibrous cellulose, ashless	Coarse	CF–1	—	—	**21/6**	*m*
CL-262	,, ,, , ashless	Standard	CF–11	—	—	**21/6**	*m*
CL-265	Cellulose phosphate	—	P–11	3·7	**16/6**	**75/–**	*m*
CL-268	Carboxymethyl-cellulose	—	CM–11	0·6	**26/6**	**115/–**	*m*
CL-273	Diethylamino-ethyl cellulose	—	DE–11	1·0	**32/–**	**144/–**	*m*
CL-284	Crystalline cellulose	—	CC–41	—	—	**40/–**	*m*

A detailed leaflet describing all Chromedia is available on application. Whatman glass fibre paper Chromedia see page 138.

LH-540

LH-600

Chromatography Ultraviolet Lamp suitable for the examination of chromatograms. Designed to scan horizontally and vertically

For details and price see LH-540 in List No. sequence.

Chromatography Viewing Cabinet providing uniform ultraviolet and tungsten illumination suitable for examining and photographing paper and thin-layer chromatograms.

For details and price see LH-600 in List No. sequence.

All items on this page normally available from stock.

Gallenkamp FRACTION COLLECTOR

An accurate and reliable automatic fraction collector originally developed at the National Institute for Medical Research, Mill Hill, London, for column chromatography and other applications. Up to 100×50 ml samples can be collected, several sizes of siphon tubes being available.

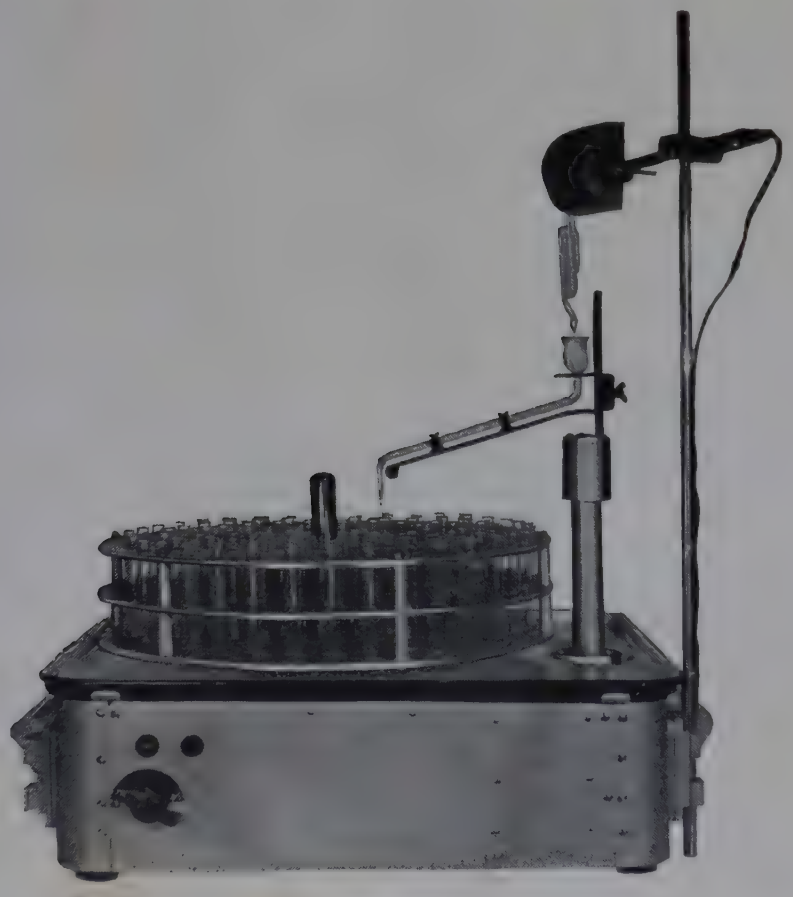
DESCRIPTION

The rotator unit which is 63 cm wide×51 cm deep has two carrying handles and clamps for four scaffold rods. The top of the casing is a vitreous enamelled steel drip tray which gives complete protection to the inner mechanism. A programme turntable, rotating on ball bearings, has a spiral guide with 100 cams which actuate a micro-switch connected to the relay circuit and the driving motor. The micro switch is supported on an arm which follows the spiral; the arm support also carries a bracket holding the guide funnel into which samples are discharged. The tube rack is fitted to the central pillar of the turntable and the holes are positioned so that, when the turntable stops, a test tube is immediately below the outlet of the guide funnel. A two-pin socket is fitted for connecting an external control device.

ASSEMBLY

To provide a complete working assembly for fraction collection from a chromatographic column the following items are required.

CL-350 or CL-352	Fraction collector.	CL-374 or CL-376	Siphon of selected capacity.
CL-370	Siphon balance.	TF-180	Test tubes.



CL-350, etc.

CL-350

FRACTION COLLECTOR, *Gallenkamp*, as specification, with guide funnel CL-360, mounting bracket, support rod and bosshead for siphon balance and **rack CL-362** for 100×12 mm tubes, but without other accessories listed.
For 200/250V 50 Hz single phase supplies.
Each **£190. 0. 0.** *b*

For 100/120V 50 Hz single phase supplies.
Each **£190. 0. 0.** *bN*

When ordering please state voltage and nature of supply.

CL-352

FRACTION COLLECTOR, *Gallenkamp*, as CL-350, **but with rack CL-364** for 150×25 mm tubes.
For 200/250V 50 Hz single phase supplies.
Each **£190. 0. 0.** *b*

For 100/120V 50 Hz single phase supplies.
Each **£190. 0. 0.** *bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

CL-360 **Guide funnel,** with long bent stem. Each **£0.14. 0.** *a*

CL-362 **Tube rack,** anodised aluminium, with 100 holes to accept 100×12 mm tubes ... ... Each **£17. 0. 0.** *b*

CL-364 **Tube rack,** as above, but for tubes 150×25 mm. Each **£17. 0. 0.** *b*

ACCESSORIES

CL-370 **Siphon balance,** with adjustable counterpoise for siphons CL-374 and CL-376 ... Each **£10. 5. 0.** *b*

CL-374 **Siphons,** borosilicate glass, for use with organic liquids.

Capacity	1	2·5	5	10	25	50 ml	
Each	**22/–**	**22/–**	**22/–**	**23/–**	**25/6**	**39/–**	*a*

CL-376 **Siphons,** borosilicate glass, for use with aqueous solutions.

Capacity	1	2·5	5	10	25	50 ml	
Each	**22/–**	**22/–**	**22/–**	**23/–**	**25/6**	**39/–**	*a*

CL-380 **Lablox set,** to form a framework 215 cm (7 ft) high to support fraction collector together with chromatography column and supply reservoir. Comprising the following components:—

SM-540	2	Rods 84 in.	SM-524	22	Connectors
SM-540	2	,, 60 in.	SM-528	10	Adjustable angle adapters
SM-540	2	,, 36 in.			
SM-540	4	,, 30 in.	SM-550	4	Feet
SM-540	4	,, 24 in.	SM-560	1	Key
SM-540	5	,, 15 in.			

Set **£15.10. 0.** *b*

CL-382 **Lablox set,** to form a framework 122 cm (4 ft) high mounted on the fraction collector base. Supports a short chromatography column and supply reservoir and comprises the following components:—

SM-540	4	Rods 48 in.	SM-524	14	Connectors
SM-540	1	,, 36 in.	SM-528	6	Adjustable angle adapters
SM-540	2	,, 30 in.			
SM-540	2	,, 24 in.	SM-560	1	Key
SM-540	2	,, 15 in.			

Set **£7.10. 0.** *b*

TF-180 **Test tubes,** *Pyrex brand* **glass.** For prices see entry in List No. sequence.

Items on this page normally available from stock except those coded *N*.

CHROMATOGRAPHY SYSTEMS

LKB chromatography apparatus is assembled from versatile modules which make possible several versions of each basic system. These basic modules are grouped under the following headings:

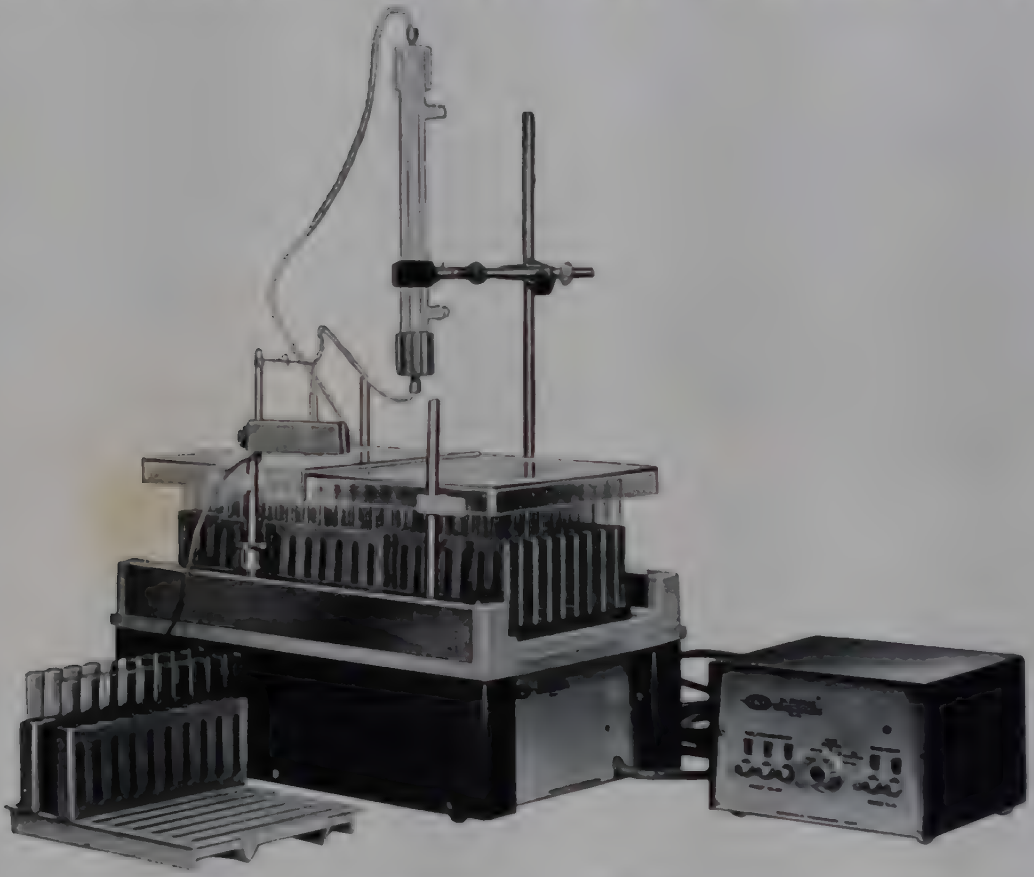
UltroRac, a compact, rectangular fraction collector with tube rack loading, for cold room and general laboratory use;

RadiRac, a circular fraction collector with a choice of circular, spiral or square-wave delivery patterns and tube rack loading;

ReCyChrom, apparatus for high-resolution recycling column chromatography;

Uvicord, ultraviolet absorptiometers for continuous monitoring of chromatography and other effluents.

ULTRORAC FRACTION COLLECTOR



The *UltroRac* is compact and space saving yet it offers all the facilities required of a fraction collector. Fully loaded, it has a capacity of 200 tubes in racks of 10 which, as they become filled, can be replaced by racks of empty tubes. Fraction changes are initiated either by timed flow or drop counting, or by a siphon accessory. The operational controls are built into a single hermetically sealed control unit which can be removed from the collector for its remote operation in, for example, a refrigerator.

The polypropylene tube racks fold at the middle in order to stand firmly when removed from the carrier or storage tidy. Stainless steel is used for the support rods and all parts likely to come into contact with liquids. Plastics dust covers are provided to protect all tubes during operation.

TECHNICAL DATA

Operational temperature range	0 to 45°C
Timed flow interval	0·1 to 99·9 minutes
Drop count interval	1 to 999 drops
Siphon capacities	5 or 25 ml
Auto switch-off	Operates after 1 to 99 racks (preset)
Duration of fraction change	2 seconds approximately
Tube sizes; diameter	15 to 18 mm
length	75 to 200 mm
Event marking	Internal contacts close for 1·2 sec at each fraction change.
	H W D
Dimensions overall with 160 mm tubes	34 × 34 × 50 cm

***CL-430**

FRACTION COLLECTOR, *LKB UltroRac*, as specification with drop counter head, ptfe tubing, 20 tube racks, 20 rack carriers, 2 dust covers and rods, rod for drop counter head, adapter cable for recorders CL-780 and CL-785 for event marking, 2 rack trays, 2 stainless steel support rods, tools, fuses and instructions manual.

For 200/240V 50 Hz single phase supplies.

Each **£400. 0. 0.** *f*

REPLACEMENT PARTS

*CL-450	**Tube racks,** pack of 4 blue and 1 grey.	Pack	£3. 0. 0.	*f*
*CL-452	**Tube rack,** pack of 5 blue	Pack	£3. 0 0.	*f*
*CL-454	**Rack trays**	Pack of 2	£1. 14. 0.	*f*

ACCESSORIES

*CL-460	**Cabinet,** for remote housing of control unit. Complete with cable.	Each	£18. 0. 0.	*f*
*CL-462	**Extension cable,** 5 metres long, for remote use of control unit	Each	£7. 10. 0.	*f*
*CL-464	**Siphon stand**	Each	£30. 10. 0.	*f*
*CL-466	**Adapter cable,** for siphon stand ...	Each	£2. 15. 0.	*f*
*CL-468	**Siphons.**			

Size	5	25 ml	
Each	£2. 6. 0.	£2. 6. 0.	*f*

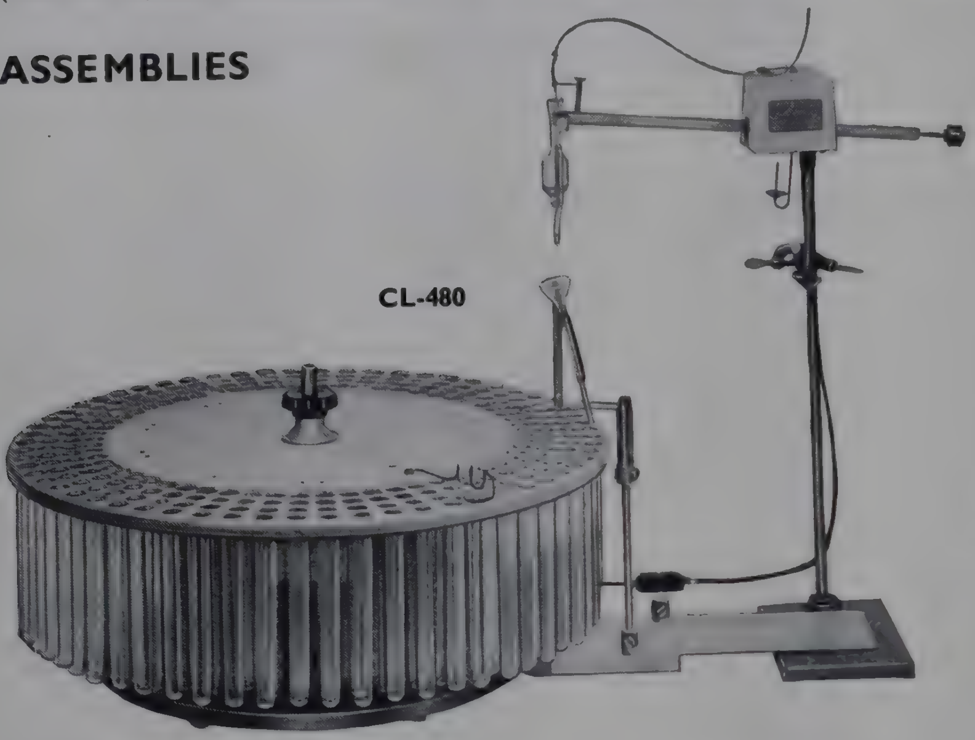
Siphons are available with 2, 3 or 4 mm bore outlets. When ordering please state size and bore required.

RADIRAC FRACTION COLLECTOR

RadiRac is a system of adaptable basic fraction collector components which can be assembled to give reliable collectors functioning in several different ways. Fraction sizes may be controlled by **volume** (1 to 25 ml siphons) or **timed flow** (4 to 60 minute fraction intervals).

The rotator holds 240 collecting tubes and its motion can be **circular** (up to 60 fraction from each of 4 columns simultaneously), **spiral** (for 240 fractions from a single source) or **square wave** (for collection in removable/replaceable racks of 24 tubes each).

ASSEMBLIES



CL-480

***CL-480**

FRACTION COLLECTOR, *LKB RadiRac* **assembly OA,** for volumetric siphoning in circular and spiral distribution patterns. Comprising one each of the following:

CL-500	Rotator
CL-530	Siphon stand
CL-532	Adapter cable
CL-540	Siphon
CL-550	Collector plate
CL-575	Guide plate
CL-580	Spiral guide

For 220/240V a.c. single phase supplies. **Without retort stand.** Assembly **£125. 5. 0.** *f*

When ordering please state volume and outlet tube diameter of siphon and whether 12 or 20 mm dia. tubes to be used.

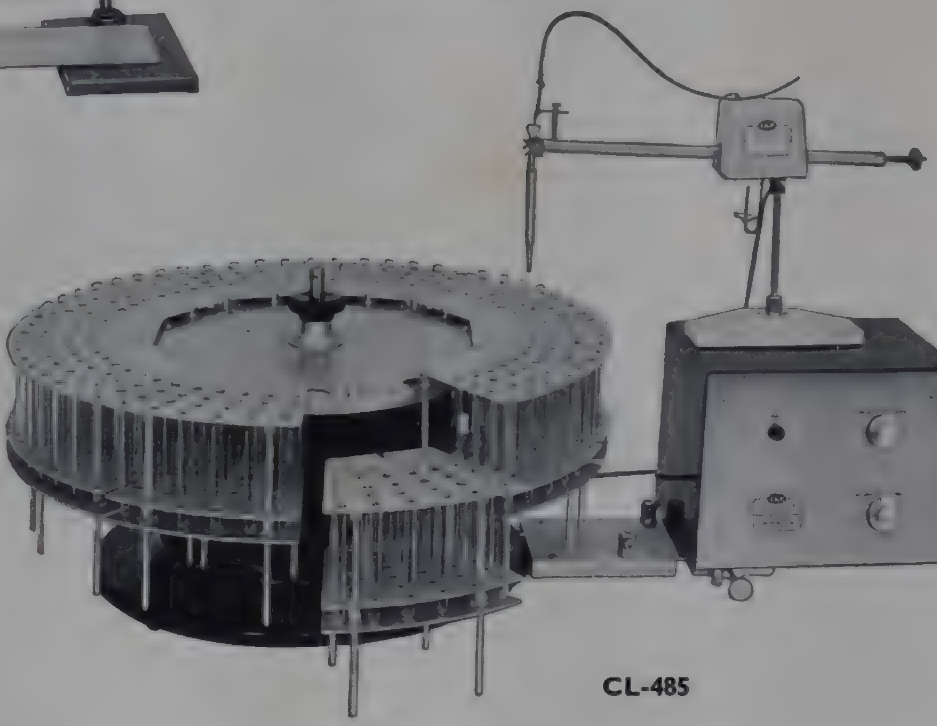
***CL-485**

FRACTION COLLECTOR, *LKB RadiRac* **assembly 3,** for timed-flow collecting in circular and spiral distribution patterns. Comprising one each of the following:

CL-500	Rotator
CL-510	Controller
CL-550	Collector plate
CL-575	Guide plate
CL-580	Spiral guide

For 220/240V a.c. single phase supplies.
Assembly **£155. 0. 0.** *f*

When ordering please state whether 12 or 20 mm dia. tubes to be used.



CL-485

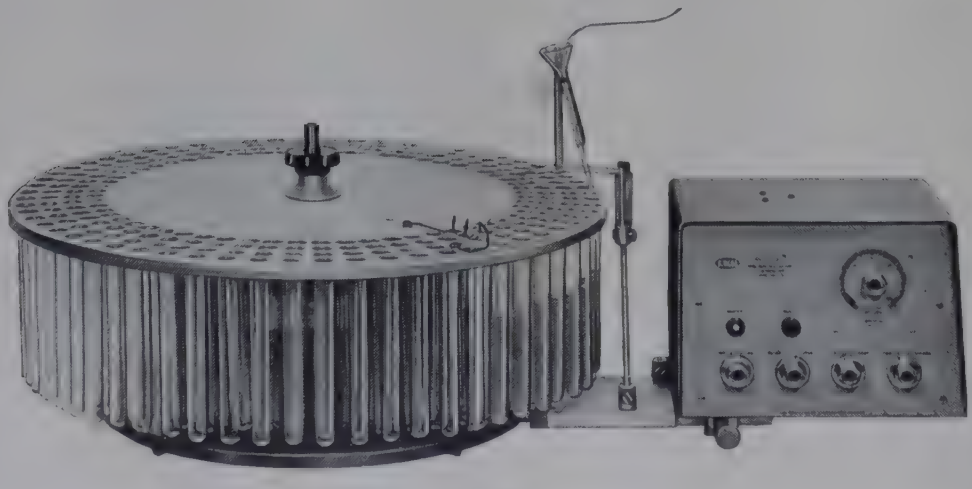
***CL-490**

FRACTION COLLECTOR, *LKB RadiRac* **assembly OB,** for volumetric siphoning in spiral and time saving 'square wave' distribution patterns. Comprising one each of the following:

CL-500	Rotator
CL-505	Distributor
CL-530	Siphon stand
CL-533	Adapter cable
CL-540	Siphon
CL-560	Tube racks (set of 10)
CL-568	Rack holder plate
CL-575	Guide plate

For 220/240V a.c. single phase supplies.
Assembly for rimmed tubes **£284. 10. 0.** *f*
For rimless tubes the following is required in addition CL-562 Rack attachment (set of 10).
Assembly for rimless tubes **£307. 10. 0.** *f*

When ordering please state volume and outlet tube diameter of siphon and whether 12 or 20 mm dia. tubes to be used.



CL-490

RADIRAC COMPONENTS

***CL-500**

ROTATOR, with rotating top-plate and stepping mechanism imparting 60 steps per revolution. For 220/240V a.c. single phase supplies ... ... Each **£90. 15. 0.** *f*
An automatic shut-down device is available. Details on application.

***CL-505**

DISTRIBUTOR, for producing the radial steps in spiral or square-wave operations, with top carriage, on which either the siphon stand CL-530 or the tubing holder CL-536 can be mounted. For 220/240V a.c. single phase supplies ... ... Each **£121. 0. 0.** *f*

***CL-510**

CONTROLLER, with timer. Selector switches for time and volume control, automatic reset and manual advance. This unit contains the main power supply transformer for operating all assemblies. For 220/240V a.c. single phase supplies ... ... Each **£76. 15. 0.** *f*

***CL-514**

ADAPTER CABLE, for connecting and synchronising a second distributor used when two streams are collected simultaneously by the same rotator. Each **£10. 10. 0.** *f*

***CL-530**

SIPHON STAND, for volume controlled operation. Attachable to the controller by means of the holder CL-534, or to the distributor ... Each **£30. 10. 0.** *f*

***CL-532**

ADAPTER, for connection of rotator to 220/240V a.c. mains supply and to the siphon stand CL-530 when neither controller nor distributor is used.
Each **£2. 10. 0.** *f*

***CL-533**

ADAPTER, for connection of distributor to 220/240V a.c. mains supply when no controller is used.
Each **£1. 15. 0.** *f*

***CL-534**

HOLDER, anodised duralumin, for attaching siphon stand CL-530 or the tubing holder CL-536 to a controller.
Each **£2. 15. 0.** *f*

***CL-536**

TUBING HOLDER, anodised duralumin, for replacing the siphon stand in time controlled operations. This unit can be attached either to the controller by means of the holder CL-534, or to the distributor.
Each **£2. 5. 0.** *f*

***CL-538**

SAFETY DEVICE, for leading effluent to waste container in event of mains failure ... Each **£22. 0. 0.** *f*

***CL-540**

SIPHONS, borosilicate glass, for mounting in siphon stand. Tolerance ± 10%, repeatability within 0·5%. Outlet tube 2, 3 or 4 mm internal diameter except on 1 and 2 ml sizes which have 2 mm bore outlet tubes only.

Capacity	1	2	3	5	10	15	25 ml	
Each	**46/-**	**46/-**	**46/-**	**46/-**	**46/-**	**46/-**	**46/-**	*f*

When ordering please state bore of outlet tube.

***CL-550**

COLLECTOR PLATES, anodised duralumin. With four concentric rows of 60 holes.

To take tubes, dia.	12	20 mm	
Each	**£9. 5. 0.**	**£9. 5. 0.**	*f*

***CL-558**

COOLING TROUGH, with connections for cooling fluid circulation. When the trough is used, tube racks require retainer attachments to prevent tubes from floating ... ... Each **£67. 15. 0.** *f*

***CL-560**

TUBE RACKS, anodised duralumin with four removable legs, to take 24 tubes in four segment rows. For square-wave sequence collection.

To take tubes, dia.	12	20 mm	
Each	**£2. 5. 0.**	**£2. 5. 0.**	*f*

***CL-562**

RACK ATTACHMENTS, for rimless collection tubes, mounted directly on four legs of CL-560.

To take tubes, dia.	12	20 mm	
Each	**£2. 10. 0.**	**£2. 10. 0.**	*f*

***CL-563**

RETAINER ATTACHMENTS, set of ten for use with racks CL-560 (with or without CL-562) when used with cooling trough CL-558.

For tubes, dia.	12	20 mm	
Set	**£30. 0. 0.**	**£30. 0. 0.**	*f*

***CL-564**

TUBE RACK, as CL-560, but to take tubes of dia. other than 12 and 20 mm ... ... Each **£2. 5. 0.** *f*

***CL-566**

RACK ATTACHMENT, as CL-564, but to take rimless tubes of dia. other than 12 and 20 mm.
Each **£4. 5. 0.** *f*

When ordering CL-564 and CL-566 please specify external dia. of collection tubes.

***CL-568**

RACK HOLDER PLATE, anodised duralumin, for loading ten tube racks directly on to the rotator.
Each **£7. 7. 0.** *f*

***CL-570**

DUST COVER, white polystyrene, with pillar for mounting on rotator ... ... Each **£14. 0. 0.** *f*

***CL-575**

GUIDE PLATE, aluminium, for accurate alignment and firm clamping of sub-units in all assemblies.
Each **£4. 8. 0.** *f*

***CL-580**

SPIRAL GUIDE, for spiral collection sequence without distributor. Complete with glass funnel.
Each **£7. 15. 0.** *f*

***CL-582**

RADIAL GUIDE, for square-wave collection of liquids unsuitable for flexible tubing delivery to collector tubes. This attachment is used in conjunction with some components of the spiral guide CL-580. Each **£16. 5. 0.** *fN*

***CL-585**

LARGE VOLUME COLLECTION ATTACHMENT, for time controlled collection of litre sized fractions. Consists of a glass funnel and a metal holder attached directly to the shaft of the rotator.

No. of receivers	10	12	15	20	30
Stepping intervals per receiver	6	5	4	3	2

Each **£5. 15. 0.** *fN*

Suitable collecting tubes see **TEST TUBES,** light wall, TF-180 or 182.

Items on this page normally available from stock except those coded *N.*

RECYCHROM

A comprehensive recycling liquid/solid chromatography system in which sample mixtures are repeatedly passed through a short column until the required separation has been achieved.

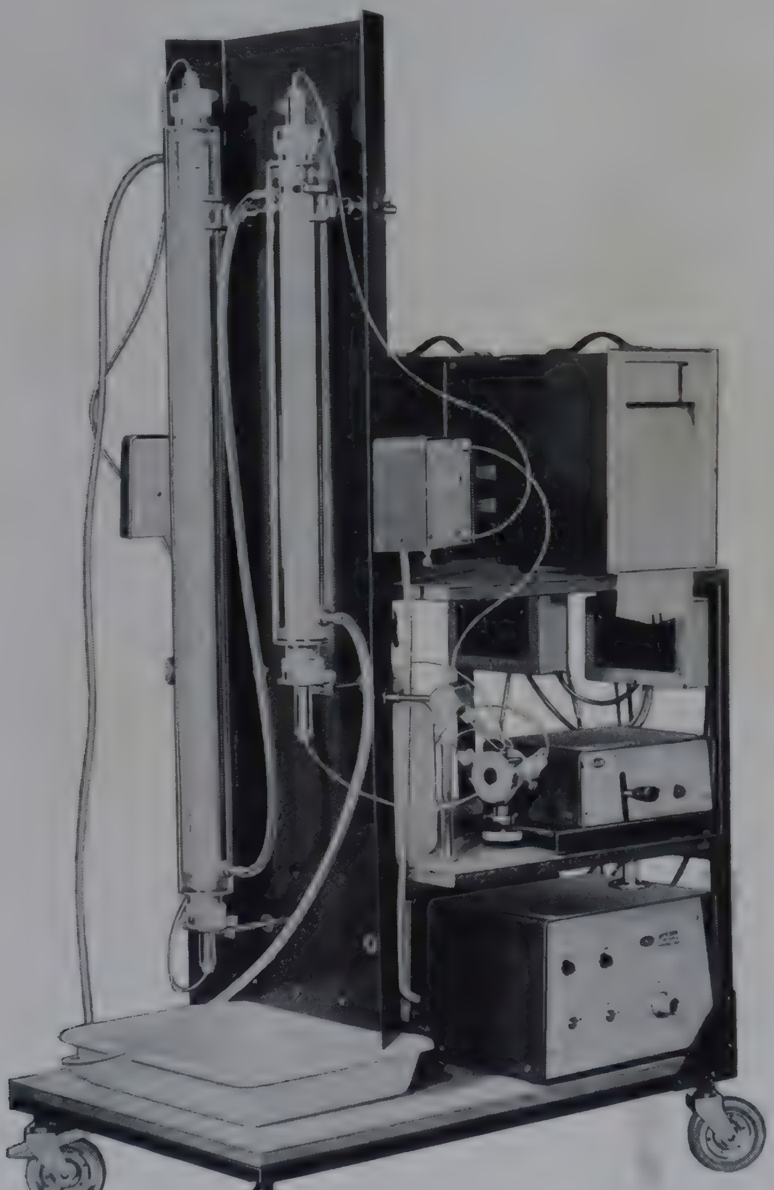
The main advantages of the technique are:

(a) that a short column can be prepared having a degree of homogeneity and a low pressure differential not possible with a long column.

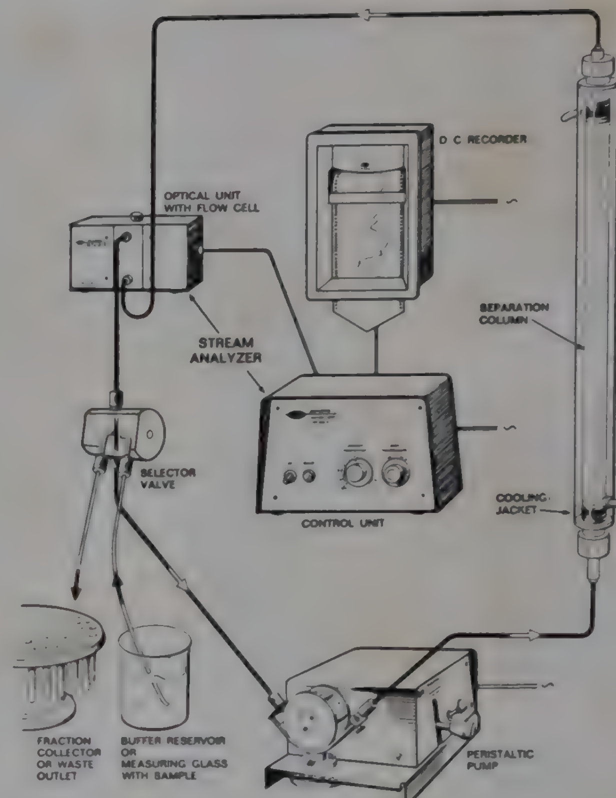
(b) that recycling can be continued to any level of separation, whereas with the traditional single passage through one long column, separation is fixed.

(c) that, by monitoring the column effluent, components may be bled off at intermediate stages, while the remainder are left to continue recycling.

In the *ReCyChrom* these facilities are exploited to the full and to a high standard of separation performance. The instrument may be used in virtually all cases where normal column chromatography is relevant; special applications include the separation of samples with small differentials in molecular sizes such as Cytochrome C (Molecular weight = 13,000) and Myoglobin (MW = 17,000) or the acid hydrolysis products of DNA.



Typical *ReCyChrom* **Assembly**


D C RECORDER
OPTICAL UNIT WITH FLOW CELL
SEPARATION COLUMN
STREAM ANALYZER
SELECTOR VALVE
CONTROL UNIT
COOLING JACKET
FRACTION COLLECTOR OR WASTE OUTLET
BUFFER RESERVOIR OR MEASURING GLASS WITH SAMPLE
PERISTALTIC PUMP

ASSEMBLY AND OPERATION

The diagram shows a typical *ReCyChrom* assembly. The **separation column** is fitted with upper and lower plungers carrying filter caps between which the packing material is supported. A **glass filling funnel** and an adapter sleeve are supplied for packing the column. A **column cooling jacket** is available for both 650 and 1050 mm columns.

During a chromatographic separation the effluent is circulated through thick wall **polythene tubing.** The sample is introduced (or effluent bled off) when the two-way **changeover valve** is set to 'open circuit'. For recycling it is set to 'closed circuit'.

The pump speed of the two channel **peristaltic pump** is continuously variable. A **flow cell** in conjunction with the **stream analyser** enables the column stream to be monitored continuously. This indicates the progress of the separation and enables bleed-off to be timed accurately.

***CL-600**

RECYCLING SYSTEM, *LKB ReCyChrom*, **standard set,** comprising:

CL-604	Peristaltic pump
CL-615	Changeover valve
CL-620	Separation column, 1050 × 32 mm
CL-625	Separation column, 650 × 32 mm
CL-630	Cooling jacket, for CL-620
CL-635	Cooling jacket, for CL-625
CL-640	Accessory kit

Supplied with 10 metres of 10 mm bore rubber tubing, pack of tube clamps, glass funnel, adapter sleeve and mobile trolley.

For 220/240V a.c. single phase supplies.

Set **£435. 0. 0.** *f*

***CL-602**

RECYCLING SYSTEM, *LKB ReCyChrom*, **economy set,** comprising:

CL-604	Peristaltic pump
CL-615	Changeover valve
CL-620	Separation column, 1050 × 32 mm
CL-640	Accessory kit

Supplied with glass funnel and adapter sleeve.

For 220/240V a.c. single phase supplies.

Set **£265. 0. 0.** *f*

RECYCHROM COMPONENTS

***CL-604**

PERISTALTIC PUMP. A variable speed 0–5 rev/min twin channel pump with six stainless steel rollers. Provision is made for the addition of a further six rollers CL-607 to minimise flow pulsation if required. Supplied with connectors equally suitable for 1·6 and 2·4 mm bore tubing, 1·5 metres of 1·6 mm bore clear non-toxic vinyl tubing, and gearbox charged with oil.

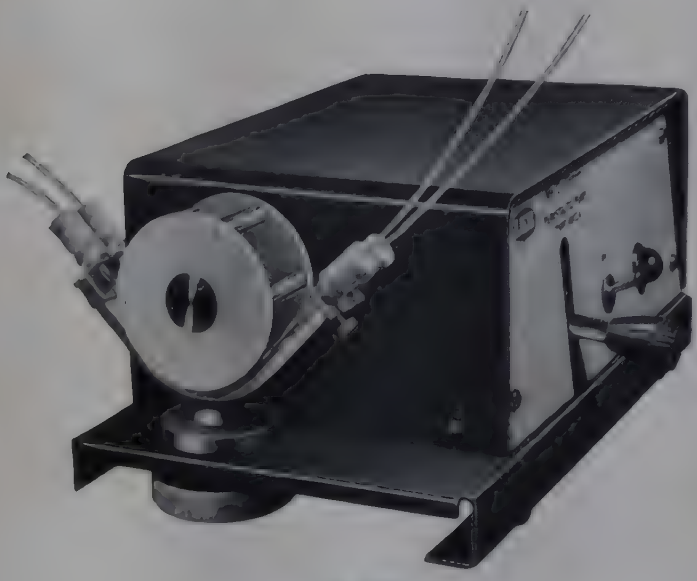
Flow rates per channel

Flow rate	0–80	0–160	0–290	0–390 ml/hr
Tubing bore	1·6	2·4	3·2	4·0 mm

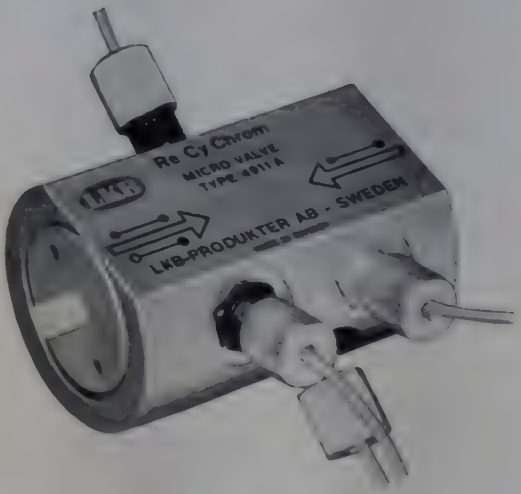
For 220/240V a.c. single phase supplies.
Each **£158. 0. 0.** *f*

ACCESSORIES AND REPLACEMENT PART

***CL-605**	**Tubing kit,** comprising 1·5 metres each of 2·4, 3·2 and 4·0 mm bore clear non-toxic vinyl tubing and connectors equally suitable for 3·2 and 4·0 mm bore tubing. Each	**£4. 10. 0.**	*f*
***CL-607**	**Steel rollers** ... ... Pack of 6	**£2. 0. 0.**	*f*
***CL-609**	**Lubricating oil,** for gearbox, in bottle containing 360 ml. Each	**£0. 7. 6.**	*f*



CL-604



CL-615

***CL-615**

CHANGEOVER VALVE, four port with two unconnected flow paths. After operation, the inlet to one and outlet from the other path are closed and the remaining two ports linked. Also for directing a liquid flow to either of two alternative routes or for ON/OFF use with a single flow system. The liquid path is entirely of ptfe and the internal dead volume is only 0·33 ml. Suitable for operation up to 8 kg/cm² (112 lb/in²). Complete with short rod for fixing to laboratory rods or scaffolding, and connectors for plastics tubing of 0·7–2 mm bore (1·2–2·8 mm o.d.). Dimensions 7 cm × 3·7 cm dia.
Each **£35. 0. 0.** *f*

***CL-620**

SEPARATION COLUMN, 1050 × 32 mm dia., complete with end collars, plungers, extension pieces and holders ... ... Each **£62. 0. 0.** *f*

***CL-625**

SEPARATION COLUMN, as CL-620 but length 650 mm ... ... Each **£58. 0. 0.** *f*

***CL-630**

COOLING JACKET, for CL-620. Each **£21. 0. 0.** *f*

***CL-635**

COOLING JACKET, for CL-625. Each **£19. 0. 0.** *f*

***CL-640**

ACCESSORY KIT, comprising inlet filter sleeve, 4 rubber expansion rings, 2 pinch clamps, porous plastics filters CL-642, 6 filter membranes CL-644, and 10 metres of 0·85 mm bore polythene tubing. Each **£8. 0. 0.** *f*

REPLACEMENT PARTS

***CL-642**	**Porous plastics filter** ... Pack of 10	**£4. 12. 0.**	*f*
***CL-644**	**Filter membrane,** with holder rings. Pack of 6	**£3. 8. 0.**	*f*

THE USE OF COMPONENT MONITORS WITH THE RECYCHROM

To observe the progress of chromatographic separations in *ReCyChrom* one of the following instruments may be used.

Uvicord ultraviolet absorptiometers, which measure UV absorption at 254 mμ. For details see next page.

Conductolyzer conductivity analyser, which measures the resistance of column effluents and can record very small changes of concentration of a component.

Multichannel absorptiometer for measuring light transmission in the wavelength range 400–700 mμ. This instrument has three separate channels which can be used singly.

Full details of these instruments are available on request.

THE USE OF FRACTION COLLECTORS WITH THE RECYCHROM

Suitable fraction collectors for the fractionation and collection of *ReCyChrom* column effluents are:

UltroRac the compact rectangular fraction collector, or **RadiRac** a versatile and dependable fraction collector system which can be 'tailored' to individual requirements.

For details of both these instruments see pages 143 to 145.

UVICORD ABSORPTIOMETERS

High stability, precision UV absorptiometers for continuous flow monitoring. They are suitable for use with chromatography systems and ideal for observing progress on *ReCyChrom* separations. *Uvicord I* operates at 254 mμ and *Uvicord II* at 254 or 280 mμ. For cold-room use *Uvicord I* requires a small cold-room attachment but *Uvicord II* can operate in ambient temperatures of 0–30°C without modification.

POWER
UV LAMP
LKB UVICORD
CONTROL UNIT
ON
ON
ZERO

CL-740

***CL-740**

ABSORPTIOMETER, ultraviolet, *LKB Uvicord I*, comprising an optical unit with phototube, UV lamp, black glass filter, nickel sulphate liquid filter for 254 mμ operation, 3 mm optical path quartz flow cell, and cell connector assembly and a control unit incorporating the lamp stabiliser and the d.c. amplifier with outputs for a 0–0·3 milliampere galvanometer recorder or a 10 or 100 mV potentiometric recorder. Supplied with 2 metres ptfe connecting tubing, two flanging tools, spare UV lamp, fluorescent rod and instructions manual. For 200/250V a.c. single phase supplies. **Without recorder.**

Each **£270. 0. 0.** *f*

When ordering please state voltage and nature of supply.

ACCESSORY

***CL-745** **Coldroom attachment,** comprising heating element, transformer and insulation for UV lamp. For 220/240V a.c. single phase supplies only ... Each **£14. 15. 0.** *fS*

When ordering please state voltage and nature of supply.

***CL-760**

ABSORPTIOMETER, ultraviolet, *LKB Uvicord II*, comprising a detector unit with photoelectric detector and high impedance amplifier, low pressure mercury UV lamp, black glass filter, interference filters for 254 and 280 mμ, 3 mm optical path quartz flow cell, and cell connector assembly and an electrical unit with the lamp stabiliser and outputs for a 0–0·3 mA milliampere galvanometer recorder or a 10 or 100 mV potentiometric recorder. Supplied with 2 metres ptfe connecting tubing, flanging tool, spare UV lamp, fluorescent rod and instructions manual. For 200/250V a.c. single phase supplies. **Without recorder** ... ... Each **£550. 0. 0.** *f*

When ordering please state voltage and nature of supply.

RECORDERS (for Chromatography Systems)

***CL-780**

RECORDER, CHOPPER BAR GALVANOMETER TYPE, single channel, suitable for use with *Uvicords* CL-740 and CL-760. Supplied with 3 rolls of chart paper, printing ribbons, and connecting cables for signal and event marker inputs. For 220/240V a.c. single phase supplies.

Chart width, mm	140
Chart speeds, mm/hr	10, 20 and 60
Accuracy	±1·5% of full scale
Printing interval	20 seconds between dot marks
Event marking	Contact closure to actuate colour changing mechanism
Range, mA d.c.	0–0·3
Internal resistance, ohms	500

Each **£185. 0. 0.** *f*

***CL-785**

RECORDER, CHOPPER BAR GALVANOMETER TYPE, six channel, suitable for use with *Uvicords* CL-740 and CL-760. Supplied with 3 rolls of chart paper, printing ribbons, two input signal cables and ten leads for parallel connecting of channels. For 220/240V a.c. single phase supplies.

Chart width, mm	140
Chart speeds, mm/hr	5, 10 and 30
Accuracy	±1·5% of full scale
Printing interval	10 seconds between dot marks, 1 minute between dots on any one channel
Event marking	Contact closure actuates marginal event mark using one signal channel
Range, mA d.c.	0–0·3
Internal resistance, ohms	500

Each **£250. 0. 0.** *f*

REPLACEMENT PARTS

***CL-790**	**Chart rolls,** linear calibration.	Per roll	**£0. 8. 6.**	*f*
***CL-792**	**Chart rolls,** logarithmic calibration.	Per roll	**£0. 8. 6.**	*f*
***CL-794**	**Printing ribbons,** 3 red and 3 blue.	Pack	**£4. 7. 0.**	*f*
***CL-796**	**Printing ribbons,** 6 different colours.	Pack	**£4. 7. 0.**	*f*

Items on this page coded *S* normally available from stock.

Gallenkamp JUNIOR GAS CHROMATOGRAPH

- Ideal for educational purposes
- Suitable for routine analyses
- Simple controls—battery operation
- For use with galvanometer or recorder
- Open layout—full view window
- For liquids with boiling points up to 80°C

CL-910 with CL-940

The *Gallenkamp* Junior Gas Chromatograph is intended for use in universities and technical colleges where the teaching of basic concepts of gas chromatography is an important introduction to the subject. It may be used both for demonstrations or individual experiments and enables the student to carry out analyses of unknown mixtures and to investigate the effects of varying the operating parameters. A teaching manual describing nine experiments is available as CL-928. By careful design the response is practically linear, undesirable characteristics such as tailing of peaks and zero drift have been minimised, and the apparatus is thus also suitable for simple applications in fields other than teaching.

DESIGN FEATURES

Sample injection. A hypodermic syringe is used to inject gas or liquid samples through a gastight, replaceable silicone rubber seal. A range of suitable syringes is listed under accessories.

Column. The standard instrument incorporates a 120 cm general purpose column packed with silicone impregnated Celite. For convenience the column is coiled and connected to the gas flow system by screw couplings. Unfilled columns to a maximum length of 360 cm are available, each with full packing instructions.

Gas flow system. Annealed copper tubing is used throughout. The reference stream is balanced to the column stream by means of a fine needle valve and provision is made for connecting to flowmeters if gas flow needs to be measured accurately. For most purposes, because of its ready availability and chemical safety, nitrogen is preferred as a carrier gas, but other gases may be used if required. A two stage diaphragm pressure regulator is essential for steady flow of the carrier gas.

Detector. For simplicity and versatility, a robust katharometer detector is used. Special care has been taken in the design of this component in order to minimise baseline drift and temperature sensitivity. The sensing elements are a pair of matched thermistors incorporated in a d.c. bridge which is supplied by a 4·5V long life dry battery. A rheostat and a small milliammeter are provided for the control and measurement of bridge currents.

External connections. No tools are needed to set up the apparatus. External gas connections are by rubber tubing nozzles, terminals are provided for galvanometer or recorder leads and flying leads connect the internal dry battery.

Gallenkamp JUNIOR GAS CHROMATOGRAPH

(continued)

SUITABLE FOR INVESTIGATING:

Retention times and volumes for individual organic solvents.
Effects of varying the katharometer bridge current.
Effects of varying the carrier gas flow rate.
Effects of varying column length.
Simple solvent and vapour mixtures.
Comparison between peak height and peak area methods.
Effects of changing the column packing.

TECHNICAL DATA

For the approximate guidance of the prospective user, the following values give satisfactory results when the chromatograph is used with a 5 mV recorder. These values do not represent the full range of the instrument and precise values will depend upon individual columns and samples.

Bridge current	5 mA
Gas flow	20–100 ml/min
Sample volume—Liquids	10 μl
Gases	0·5–1 ml
Detection limit	10^{-7} g

CL-910

GAS CHROMATOGRAPH, Junior, *Gallenkamp*, as specification, complete with 4·5V battery but without galvanometer or recorder, pressure regulator or flowmeters ... ... Each £58. 0. 0. *b*

REPLACEMENT PARTS

CL-915	**Column,** 120 cm general purpose silicone.	Each £2. 0. 0.	*b*
CL-921	**Thermistors,** matched pair in special mounts, packed with protective sleeves	Pair £16. 0. 0.	*b*
CL-924	**Battery,** *Ever Ready* No. 126, 4·5V.	Each £0. 2. 9.	*m*
CL-926	**Injection port seals,** silicone rubber.	Dozen £0. 12. 0.	c

ACCESSORIES

CL-928 **Teaching manual, 'Experiments in Gas Chromatography'.** A useful booklet describing nine experiments designed to introduce the student to the basic principles and practical applications of gas chromatography. Each £0. 3. 6. *f*

CL-930 **Columns,** unfilled, complete with couplings.

Length	120	180	240	360 cm	
Each	**22/6**	**26/6**	**29/6**	**36/6**	*b*

AB-940 **Absorption tube,** in-line, for drying carrier gas. ... ...

FL-550 **Flowmeter,** 0-100 ml/min (2 required) ...

GD-530 **Pressure** regulator, variable ... ...

TX-625 **Tubing,** pressure, 6·3 mm i.d. recommended for connecting between the pressure regulator and carrier input nozzle ...

CP-285 **Clip,** hose, 17/12 mm recommended to ensure a gastight seal between the hose and nozzle ... ...

EF-203 **Scalamp galvanometer,** *Pye*. This galvanometer is suitable for indicating the chromatograph output ... ...

For prices see entry in List No sequence.

CL-940 **Strip chart recorder,** *Control Instruments* High speed, single point continuous record, 1·3 sec full scale deflection. Input 500μV d.c. with plug-in range unit for 5 mV and event marker. Chart speeds 15, 30 and 60 in./hr. A simple slot in the case, without drive mechanism allows the chart to be fed out on to the bench, if required. For 200/260V 50 Hz supplies. Each £175. 10. 0. *f*

CL-941 **Chart rolls,** for CL-940, calibrated width 6 in, subdivided in 50 divisions. Time scale marked at ½ in intervals ... ... Each £0. 12. 6. *f*

CL-945 **Needles,** all metal, size No. IV for use with SY-410 and SY-430 Dozen £0. 13. 3. c

SY-410 **Syringe,** 1 ml, for sample injection in work of low accuracy ... ...

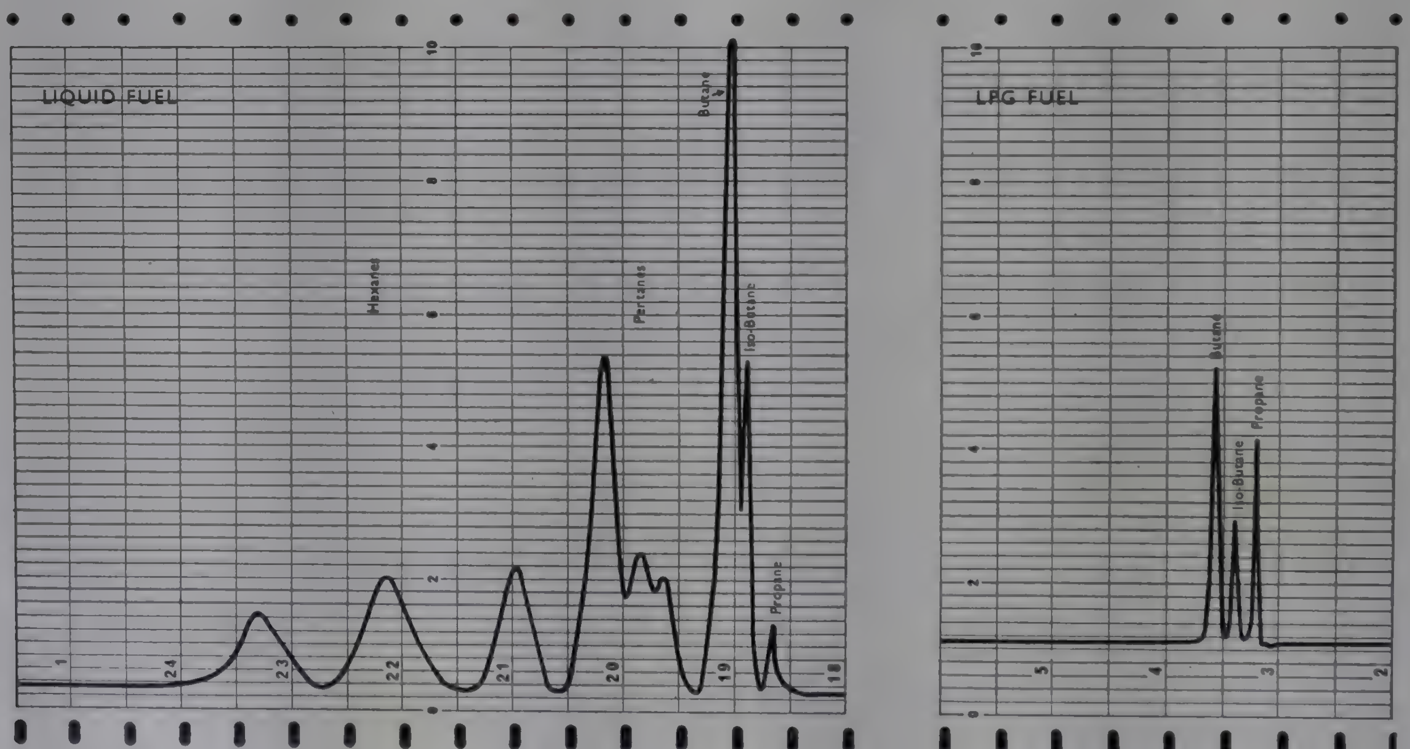
SY-430 **Syringes,** plastics ... ...

SY-500 **Microlitre syringe,** for the precise measurement of liquid samples. Capacity 50 μl, subdivided in 1 μl subdivisions. With ground fitting to accept Luer pattern needles

SY-520 **Gastight syringe,** for the introduction of precisely measured gas samples. Capacity 0·5 ml, subividded in 0·01 ml subdivisions. With ground fitting to accept Luer pattern needles ... ...

SY-550 **Needle, syringe,** for use with SY-500 and SY-520, Luer fitting with axial point to reduce the tearing of injection port seal

For prices see entries in List No. sequence.



Comparison carried out on a Junior Gas Chromatograph between liquid and LPG lighter fuels.

All items on this page normally available from stock.

PYE SERIES 104 CHROMATOGRAPHS

A range of chromatographs designed on modular principles with certain components common to all versions, enabling change from one system to another by the addition or replacement of one or more modules.

The series comprises the following models:

Model 4	Flame ionisation detector isothermal chromatograph
Model 14	Flame ionisation detector temperature programmed chromatograph
Model 24	Dual flame ionisation detector temperature programmed chromatograph
Model 34	Katharometer detector isothermal chromatograph
Model 44	Heated katharometer detector programmed chromatograph
Model 54	Heated flame ionisation detector programmed chromatograph
Model 64	Heated dual flame ionisation detector programmed chromatograph
Model 74	Heated electron capture detector programmed chromatograph
Model 84	Heated electron capture/flame ionisation detector programmed chromatograph

CM-225 with CM-250
CM-230 with CM-250

The modules and accessories constituting each model are shown in the following table; optional accessories are listed below.

Part No.	Series 104 Modules	Modules comprising each model								
		Model No. 4	14	24	34	44	54	64	74	84
12104	Analyser Oven	1	1	1	1	1	1	1	1	1
12141	Single F.I.D. Head	1	1	–	–	–	–	–	–	–
12142	Dual F.I.D. Head	–	–	1	–	–	–	–	–	–
12143	Katharometer Head	–	–	–	1	–	–	–	–	–
12144	Heated Katharometer Head	–	–	–	–	1	–	–	–	–
12145	Heated single F.I.D. Head	–	–	–	–	–	1	–	–	–
12146	Heated dual F.I.D. Head	–	–	–	–	–	–	1	–	–
12147	Heated E.C.D. Head	–	–	–	–	–	–	–	1	–
12148	Heated E.C./F.I.D. Head	–	–	–	–	–	–	–	–	1
-12180	Bubble Flowmeter	1	1	1	1	1	1	1	1	1
12254	Programmer Controller	–	1	1	–	1	1	1	1	1
12264/1	Column Oven Controller	1	–	–	1	–	–	–	–	–
12264/2	Detector Oven Controller	–	–	–	–	1	1	1	1	1
12274/1 *	Electrical Control Unit (single channel)	1	1	1	1	–	–	–	–	–
12274/2 * *	Electrical Control Unit (dual channel)	–	–	–	–	1	1	1	1	1
12284	Electron Capture Supply	–	–	–	–	–	–	–	1	1
-12294	Katharometer Power Supply	–	–	–	1	1	–	–	–	–
12304	Ionisation Amplifier	1	1	1	–	–	1	1	1	2
12384	Analyser Connection Kit	1	1	1	1	1	1	1	1	1
12440	5 ft Glass Column empty	2	2	2	2	2	2	2	2	2
12441	5 ft Stainless steel Column empty ...	2	2	2	2	2	2	2	2	2
12634	Gas Purifying Bottle	–	–	–	–	–	–	–	2	2
12684	Gas Connection Bulkhead	1	–	–	1	–	–	–	–	–
12684/1	Gas Flow Controller (single)	–	1	–	–	–	1	–	1	–
12684/2	Gas Flow Controller (double)	–	–	1	–	1	–	1	–	1

* If injection heaters are required this item is replaced by 12274/3 (one injection heater) or by 12274/4 (two injection heaters).

* * If injection heaters are required this item is replaced by 12274/5 (one injection heater) or by 12274/6 (two injection heaters).

PYE SERIES 104 CHROMATOGRAPHS

(continued)

BRIEF DESCRIPTION OF PRINCIPAL MODULES

Analyser Oven (Part No. 12104). This is the basic module of the Series 104 range, other modules and accessories being added to form specific chromatographs. The oven is heated by air which is forced rapidly over a low thermal inertia 1·6 kW heater controlled by a platinum resistance thermometer/SCR circuit. Control and stability of temperature are 50°C to 350°C (±0·05°C) for katharometer models and 50°C to 500°C (±0·1°C) for flame ionisation detector models. Maximum heating rates for 4 mm bore packed columns vary from 48°C/min up to 150°C, to 16°C/min from 325° to 450°C.

Detector Heads

(a) **Flame ionisation** head units (Part Nos. 12141, 12142, 12145 and 12146). Four assemblies are available—single and double, heated and unheated. Each assembly or head comprises the one or two detectors with gas lines and electrical connections, the heated heads incorporating a small detector oven controlled by an SCR. The detector jet is insulated from earth and a 180V polarising voltage is applied. The electrical circuit at the detector top is anti-microphonic and each detector top is fitted with a platinum igniter filament.

(b) **Katharometer** head units (Part Nos. 12143 and 12144). Two versions are available—heated and unheated. Each comprises a four filament detector with an SCR—controlled to ±0·1°C oven in the heated version. The filaments are of tungsten (nominal cold resistance 40Ω), fitted in matched pairs. The detector has a built-in splitter and does not rely on diffusion. These heads have a maximum operating temperature of 350°C.

(c) **Electron Capture** head units (Part Nos. 12147 and 12148). Two versions are available, a single E.C. and an E.C./F.I.D. combination, both in heated heads. The Electron Capture detector is simple and robust, has a Ni 63 radioactive source for high temperature operation and can be used with either a pulsed or d.c. supply.

Programmer/Controller (Part No. 12254) to control the temperature of the Analyser Oven in accordance with a preset adjustable programme. The most complex such programme is an initial timed isothermal period followed by a period of linear increase in temperature followed by a final isothermal period.

Initial and final isothermal periods of 0–36 min (with infinity setting for final period) are provided and rates of temperature increase programmes are from 1°C/min to 48°C/min in twelve settings.

Column Oven and Detector Oven Controllers (Part Nos. 12264/1 and 12264/2) to control the temperatures of the analyser oven and detector between 50 and 500°C.

Ionisation Amplifier (Part No. 12304) to be used with either the F.I. or E.C. detectors. The amplifier produces an ignition and a stable polarising voltage for F.I. operation and amplifies the detector signal to give a f.s.d. for 5×10^{-7}A minimum to 1×10^{-12}A maximum sensitivity.

The amplifier is used in conjunction with E.C. supply unit for E.C. detectors.

Zero suppression and attentuation from 1 to 5×10^{5} are provided.

Electron Capture Supply (Part No. 12284) provides either a pulsed or d.c. voltage to the E.C. detector.

Katharometer Supply (Part No. 12294) a transistor-stabilised full wave rectifier supplying up to 100 mA at about 23V to the katharometer filaments. The module is fitted with a precision 10-position output attenuator ranging from 1 to 1000, a polarity switch and a chart event marker switch.

COMPLETE OUTFITS (for contents please refer to table on page 151).

CM-200
GAS CHROMATOGRAPH, Model 4, *Pye*, isothermal with flame ionisation detector. U.K. Each **£490. 0. 0.** f

CM-205
GAS CHROMATOGRAPH, Model 14, *Pye*, temperature programmed with flame ionisation detector. U.K. Each **£630. 0. 0.** f

CM-210
GAS CHROMATOGRAPH, Model 24, *Pye*, temperature programmed with dual flame ionisation detector. U.K. Each **£700. 0. 0.** f

CM-215
GAS CHROMATOGRAPH, Model 34, *Pye*, isothermal with katharometer detector ... U.K. Each **£475. 0. 0.** f

CM-220
GAS CHROMATOGRAPH, Model 44, *Pye*, temperature programmed with heated katharometer detector. U.K. Each **£740. 0. 0.** f

CM-225
GAS CHROMATOGRAPH, Model 54, *Pye*, temperature programmed with heated flame ionisation detector. U.K. Each **£730. 0. 0.** f

CM-230
GAS CHROMATOGRAPH, Model 64, *Pye*, temperature programmed with heated dual flame ionisation detector ... ... U.K. Each **£800. 0. 0.** f

CM-235
GAS CHROMATOGRAPH, Model 74, *Pye*, heated electron capture detector programmed chromatograph. U.K. Price on application.

CM-240
GAS CHROMATOGRAPH, Model 84, *Pye*, heated electron capture/flame ionisation detector programmed chromatograph ... ... U.K. Price on application.

NOTE 1:
All the above outfits are suitable for 210/250V 50 Hz supplies. Available for other supplies to special order.

NOTE 2:
Each of the above outfits requires, but does not include, a stripchart recorder.

RECOMMENDED RECORDERS for use with Series 104 Chromatographs.

CM-250
RECORDER, *Leeds and Northrup Speedomax W/Pye.* U.K. Each **£275. 0. 0.** f

CM-252
RECORDER, *Honeywell/Pye* ... U.K. Each **£320. 0. 0.** f

CM-254
RECORDER, *Kent Mk III/Pye*... U.K. Each **£320. 0. 0.** f

SERIES 104 MODULES, ACCESSORIES AND REPLACEMENT PARTS

All Series 104 modules listed in the table are available separately. A comprehensive range of accessories is also available including such items as integrators, injection point heaters, gas sampling valves, manual preparative kit, pyrolysis unit, syringes, and a wide variety of packed columns. An illustrated brochure giving full details of the individual modules and accessories is available, with prices, on request. Prices are also available for recommended replacement parts.

Export prices for the above chromatographs and recorders on application.

PYE SERIES 105 AUTOMATIC PREPARATIVE CHROMATOGRAPHS. Details on request.

CLOTHS AND TISSUES

CM-505

CELLULOSE WADDING B.P.C. A highly absorbent general purpose wadding prepared from wood pulp fibre. Packed in 1 lb (0·45 kg) rolls in polythene bags.
Ten rolls **£1. 10. 0.** Roll **£0. 4. 6.** *m*

CM-510

CLOTH, wiping, resin bonded cellulose fibre. Soft in texture and absorbent, these cloths may be used dry or moistened for wiping and light cleaning purposes. They will withstand careful washing. Size 50 × 25 cm in bundle of 50 ... 5 bundles **£2. 16. 0.** Bundle **£0. 12. 0.** *c*

CM-515

CLOTH, cleaning, resin bonded cotton fibre. Hard wearing dusting, polishing or washing cloths which are not absorbent although wetted fairly easily by water. When dirty they may be washed out without loss of quality. Size 46 × 46 cm ... Pack of 100 **£2. 2. 0.** *c*

CM-520

CLOTH, glass drying, pure linen, 85 × 60 cm.
Dozen **£2. 16. 0.** Each **£0. 6. 0.** *m*

CM-530

CLOTH, dusting, blue check cotton, 60 × 60 cm.
Dozen **£1. 8. 6.** Each **£0. 3. 11.** *m*

CM-535

CLOTH, dusting, yellow flannelette, 45 × 50 cm.
Dozen **£0. 14. 0.** Each **£0. 2. 10.** *m*

CM-550

CLOTHS, polishing, Selvyt.

Size	25 × 25	47 × 42	70 × 70 cm	
Dozen	**41/–**	**114/–**	**225/–**	*m*
Each	**4/10**	**10/3**	**20/6**	

CM-555

CLOTH, polishing, antistatic, 31 × 43 cm, for dissipating electrostatic charges formed on non-conducting surfaces. Suitable for all plastics ware and lenses. Packed in polythene envelope.
Dozen **£1. 12. 0.** Each **£0. 4. 2.** *c*

CM-560

CLOTH, swabbing, open net sponge cloth, 55 × 45 cm.
Dozen **£0. 8. 6.** Each **£0. 2. 6.** *m*

CM-590

LEATHER, CHAMOIS, natural skin in cuts of approximately 27 × 30 cm.
Dozen **£3. 4. 0.** Each **£0. 6. 6.** *c*

CM-620

SPONGES, *Spontex*, absorbent cellulose, approximately 14 × 11 × 4 cm when wet.
Dozen **£2. 6. 0.** Each **£0. 5. 2.** *m*

CM-650

PAPER TISSUES, white, for general laboratory disposable use where good wet strength is required. In boxes of 200 pulls, 2 ply tissue approx. 23 × 20 cm.
48 boxes **£4. 0. 0.** 12 boxes **£1. 1. 0.** *m*
Box **£0. 2. 6.**

CM-660

TISSUE, lens cleaning, *Greens* **No. 105.** 30 × 20 cm sheets supplied in boxes of 100 ... Box **£0. 8. 1.** *m*

CM-662

TISSUE, lens cleaning, *Greens* **No. 105.** In books of 10 sheets 10 × 8 cm ... ... 1000 books **£16. 15. 0.** *m*
100 books **£1. 17. 8.**
50 books **£1. 1. 2.**

CLEANING COMPOUNDS

CM-740

CLEANSER, a liquid detergent equally effective in hard, soft and salt water. Completely removes grease films and cleans all surfaces leaving a bright finish. Supplied in flexible polythene dispenser bottle containing 16 fl. oz (450 ml) ... Dozen **£1. 18. 0.** Each **£0. 4. 7.** *c*

CM-742

CLEANSER, as CM-740, but supplied in cans.

Contents	1	4 gal	
Each	**13/–**	**47/–**	*c*

CM-751

CLEANSING FLUID, *Decon* 75 **concentrate.** A powerful, bio-degradable, non-corrosive, general purpose laboratory surfactant with a pH of 10 in 2% solution. Will remove stubborn contaminants such as silicone and Apiezon oils and greases, polymer resins, blood, tars, cedarwood oil, Canada balsam and various other substances not removed by water, ordinary solvents or acid cleaning mixtures. Cleans glass, metal and plastics laboratory apparatus without leaving a trace of residue after rinsing. Decon 75 solutions have no deleterious action on skin, clothing, most metals, glass, plastics, rubber, quartz, silica or fabrics and present no disposal problems. The concentrate has anti-bacterial properties particularly suitable for use in pathology and bacteriology laboratories and tissue culture and enzymological equipment can be cleaned without fear of any temporary or cumulative toxic effects. Recommended for use with ultrasonic cleaners and for thorough decontamination from radioactive isotopes. Supplied in screw cap plastics bottle containing 8 fl. oz (225 ml).
Six bottles **£3. 12. 0.** Bottle **£0. 13. 3.** *m*

CM-752

CLEANSING FLUID, as CM-751 but supplied in polythene bottle containing two Imperial quarts.
Each **£4. 18. 0.** *m*

CM-760

CLEANSER, for stainless steel. Cleans and polishes the surface when applied with wet cloth. Supplied in dispenser containing 2¾ oz (78 g) of powder.
Each **£0. 4. 6.** *m*

POLISHES

CM-770

POLISH, wax, *Technico*, specially prepared for the preservation and polishing of laboratory bench tops and furniture. Pure wax dressing resistant to both acids and alkalis.

Tin	13½ oz	7 lb	
Each	**£0. 3. 6.**	**£0. 18. 6.**	*c*

CM-775

POLISH, wax, *Technico*, with silicone additive for extra protection of polished wooden surfaces.

Tin	13½ oz	7 lb	
Each	**£0. 5. 0.**	**£1. 11. 0.**	*c*

CLEANING BRUSHES	see BU-430 et seq.
ULTRASONIC CLEANING	see UL-100 et seq.
WASHING and DRYING EQUIPMENT	see WD-020 et seq.

All items on this page normally available from stock.

CLIPS

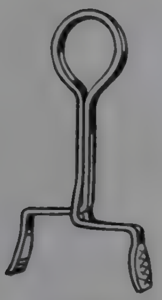
CP-220

CLIPS, Mohr, nickel plated brass, for burettes, tubing, etc.

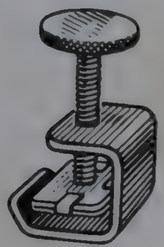
No.	1	2	3	4	
Length	5	6	7	8 cm	
Std. pack qty.	6	6	6	6	
Dozen packs	**72/–**	**82/–**	**106/–**	**125/–**	c
Std. pack	**7/2**	**7/10**	**9/9**	**11/3**	

CP-230

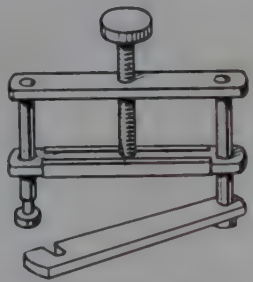
CLIP, open sided, nickel plated brass screw clip with broad pressure pad for use on tubing up to 12 mm dia.
Dozen packs **£5. 14. 0.** Pack of 6 **£0. 10. 3.** c



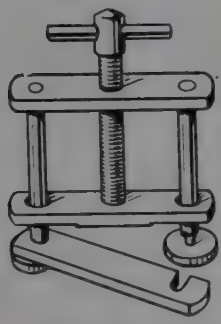
CP-220



CP-230



CP-240



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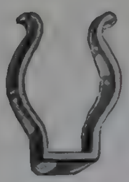

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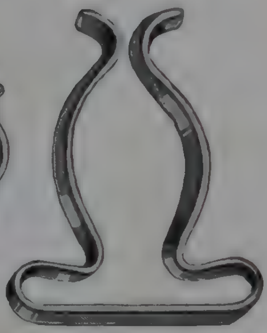
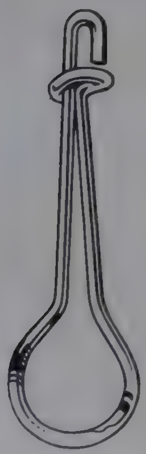
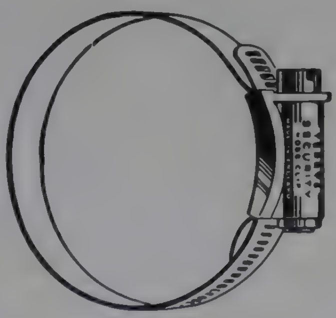


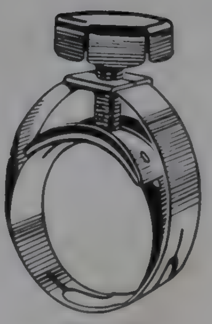
CP-266



CP-275



CP-280



CP-285

CLOCKS, stopclocks	see	TIMING APPARATUS
wall	see	FURNITURE
CLOTH, asbestos	see	ASBESTOS GOODS

CP-240

CLIPS, Hoffman, nickel plated brass, with clamping screw and hinged bottom plate.

No.	1	2	3	4	5	
Distance between bars	15	20	25	32	40 mm	
Std. pack qty.	6	6	6	6	6	
Dozen packs	**135/–**	**140/–**	**145/–**	**155/–**	**275/–**	c
Std. pack	**12/3**	**12/9**	**13/3**	**14/–**	**25/–**	

CP-245

CLIP, Hoffman, extra strong. Distance between bars 32 mm ... Dozen **£7. 5. 0.** Each **£0. 13. 3.** c

CP-264

CLIPS, SPRING, open type, with polythene coating which provides a tough, resilient surface, prevents scratching and resists corrosion. In packs of 12 complete with screws.

CP-266

CLIPS, SPRING, as CP-264, but **closed type.** In packs of 12 complete with screws.

Dia.		CP-264		CP-266		
mm	in	Doz. Packs	Pack	Doz. Packs	Pack	
6	¼	**76/–**	**7/6**	**76/–**	**7/6**	c
10	⅜	**76/–**	**7/6**	**76/–**	**7/6**	c
13	½	**90/–**	**8/6**	**90/–**	**8/6**	c
16	⅝	**90/–**	**8/6**	**106/–**	**9/9**	c
20	¾	**106/–**	**9/9**	**112/–**	**10/3**	c
26	1	**106/–**	**9/9**	**120/–**	**11/–**	c
32	1¼	**120/–**	**11/–**	**140/–**	**12/9**	c
39	1½	**135/–**	**12/3**	**210/–**	**19/–**	c
50	2	**165/–**	**15/–**	**255/–**	**23/6**	c

CP-275

CLIP, TUBING, corrosion resisting steel, for securely fastening rubber and plastics tubing to glass and metal tubulures and taps. The clip is very easy to fit and does not need a tool. It is much quicker to make a temporary connection using this clip than by twisting wire round the joint and it is more easily removed. The clip is a suitable size for condenser water connections and similar applications where the outside diameter of the tubing when stretched over a tubulure is about 10 mm... ... ... Dozen packets **£10. 0. 0.** c
Packet of 50 **£0. 18. 0.**

CP-280

CLIPS, worm drive, cadmium plated steel, with band and deep square milled thread, for securing rubber tubing to water taps, etc.

No.	1	2	3	4	5	
Maximum dia.	16	22	29	42	50 mm	
Closing down to	12	16	19	25	38 mm	
Dozen	**11/–**	**11/–**	**12/–**	**13/–**	**13/–**	c
Each	**2/7**	**2/7**	**2/8**	**2/9**	**2/9**	

CP-285

CLIPS, hose, improved pattern with double stainless steel band totally encircling the tube. Screw parts cadmium plated.

Maximum dia.	14	17	21	25	29 mm	
Closing down to	10	12	15	19	23 mm	
Dozen	**42/–**	**42/–**	**42/–**	**42/–**	**42/–**	c
Each	**4/11**	**4/11**	**4/11**	**4/11**	**4/11**	

All items on this page normally available from stock.

PROTECTIVE CLOTHING

APRONS

CP-715

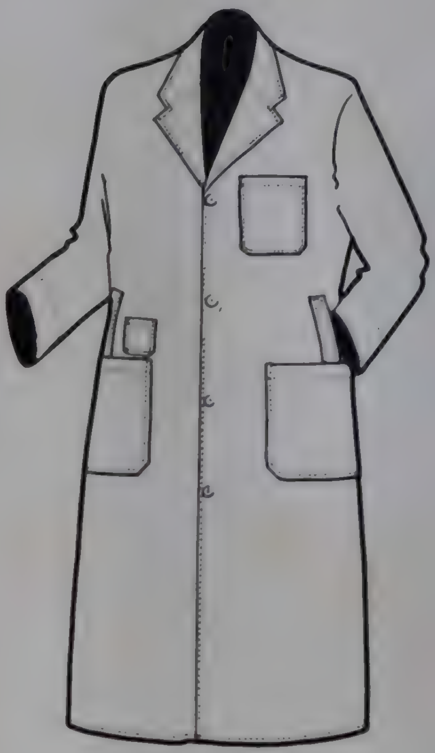
APRONS, PVC, white, non-ageing, for full protection against chemicals.

Size	86×71 34×28	102×91 cm 40×36 in	
Dozen	£7. 0. 0.	£8. 10. 0.	*m*
Each	£0. 12. 9.	£0. 15. 6.	

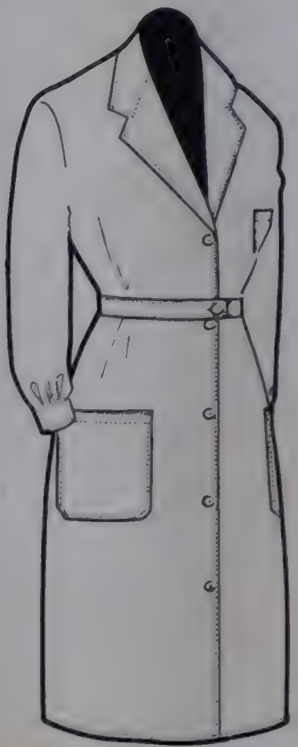
CP-720

APRONS, fabric supported acrylonitrile, for full protection against acids, oils and organic solvents.

Size	102×91 40×36	112×91 cm 44×36 in	
Dozen	£21. 10. 0.	£23. 10. 0.	c
Each	£1. 19. 0.	£2. 3. 0.	



CP-740



CP-750

LABORATORY COATS

LABORATORY COATS in white drill, in men's and women's styles, are well made of good quality materials. All seams are lapped and lock-stitched, two side and breast pockets are reinforced and double stitched. Removable buttons with ring fasteners have ample facings to prevent damage to clothing.

CP-740

COATS, LABORATORY, white drill, for men, length 46 in.

Chest size	38	40	42	44 in	
Each	41/-	41/-	41/-	41/-	*m*

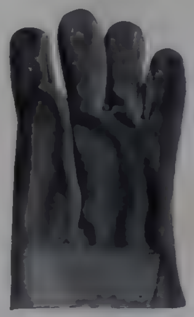
CP-750

COATS, LABORATORY, white drill, for women, belted and with step collar, length 44—46 in.

Bust size	34	36	38	40 in	
Each	36/-	39/-	39/-	39/-	*m*

CP-770

CP-775



CP-780

GLOVES

CP-770

GLOVES, asbestos, cotton lined, with thumb only. Pair **£1. 0. 0.** *m*

CP-775

GLOVES, asbestos, cotton lined, with fingers and thumb ... ... Pair **£1. 13. 0.** c

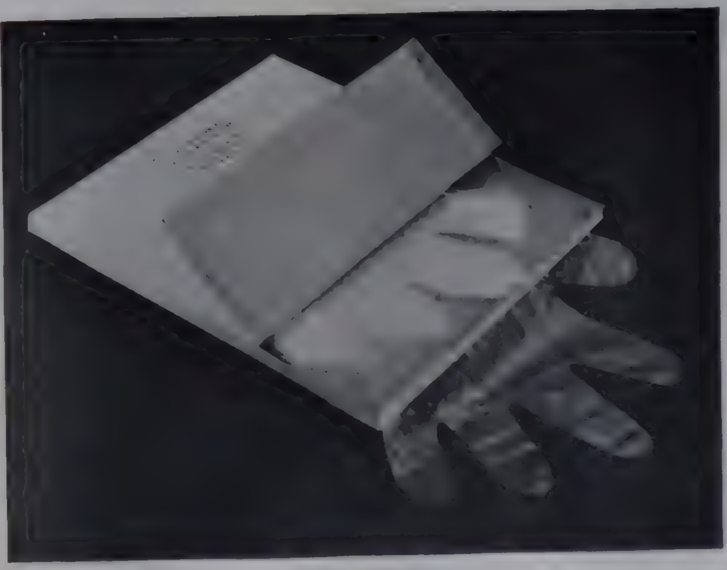
CP-780

GLOVES, chrome leather, wrist length. Pair **£0. 9. 0.** c

***CP-792**

GLOVES, polythene, expendable. These gloves, made from 150 gauge (0·04 mm) transparent polythene, provide an inexpensive hand cover which can be worn once and thrown away if contaminated. Supplied in handy dispensing packs of 100 gloves.

Size	Small	Normal	
Pack of 100	15/-	15/-	c

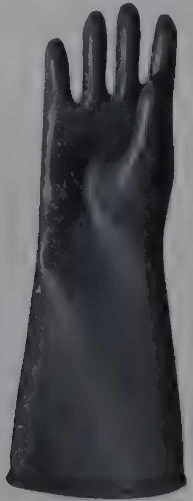


CP-792

All items on this page normally available from stock.

CP-795

CP-808


CP-810

CP-794

GLOVES, latex rubber, surgical type for general protection with extreme sensitivity.

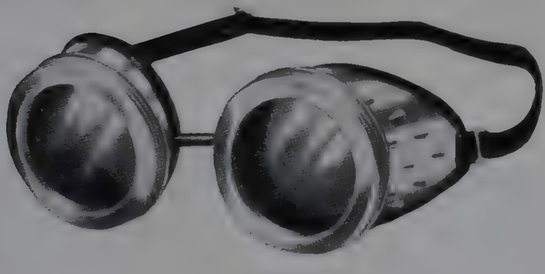
Size	7	8	9	
Dozen pairs	**46/–**	**46/–**	**46/–**	c

CP-795

GLOVES, PVC, with cotton interlock lining. For protection against chemicals, oils and greases.

Size	8	9	10	
Pair	**8/3**	**8/3**	**8/3**	c

MA-955, MA-957 GLOVES, gauntlet, for use in glove or manipulator boxes, see entries in List No. sequence.


CP-830

CP-835

GLOVES
(continued)

HOW TO MEASURE FOR GLOVES

Hold the right hand flat with fingers touching each other and with thumb raised. Measure around widest part of the hand, over knuckles, not including the thumb. Pull tape measure close, but not tight. Number of inches is glove size. For industrial gloves where loose fit is preferred to give 'working room', order 1 or 2 sizes larger than measurement.

CP-806

GLOVES, acrylonitrile, flock lined, light duty with good finger sensitivity. These gloves are resistant not only to the usual range of acids and chemicals, but also to oils, greases and organic vapours which attack normal rubber gloves.

Size	7	8	9	
Pair	**6/–**	**6/–**	**6/–**	c

CP-808

GLOVES, acrylonitrile, heavy duty. Chemical resistance as CP-806 but **fabric supported** for increased mechanical strength.

Size	8	9	10	
Pair	**14/–**	**14/–**	**14/–**	c

CP-810

GLOVES, acrylonitrile, heavy duty, as CP-808 but gauntlet type approx. 40 cm long.

Size	8	9	10	
Pair	**19/6**	**19/6**	**19/6**	c

EYE PROTECTION

CP-830

GOGGLES, lightweight, with well ventilated aluminium cups, adjustable leather nosebridge and elastic headband. The 5 cm (2 in) dia. plain clear glasses are retained in position by aluminium rings.
Dozen **£3. 14. 0.** Each **£0. 7. 4.** c

CP-835

GOGGLES, lightweight, with well ventilated moulded black nylon cups, adjustable nosebridge and elastic headband. Fitted with 5 cm (2 in) dia. clear laminated safety glasses, protected by cover glasses and retained by nylon rings ... ... Each **£1. 0. 6.** c

CP-838

GOGGLES, lightweight, as CP-835 but fitted with laminated safety glasses tinted green to Shade 5 of BS 679 instead of plain glasses ... ... Each **£1. 3. 6.** c

All items on this page normally available from stock.

EYE PROTECTION

(continued)

CP-865

EYESHIELD, plastics, a light duty eyeshield the frame of which is fitted with a replaceable, shatter resistant acetate window, available in clear, smoke and green anti-glare shades.

Window shade	Clear	Smoke	Green	
Dozen	**£5. 8. 0.**	**£5. 12. 0.**	**£5. 12. 0.**	*m*
Each	**£0. 10. 0.**	**£0. 10. 3.**	**£0. 10. 3.**	

REPLACEMENT PARTS

CP-866 **Windows**

Shade	Clear	Smoke	Green	
Dozen	**£1. 16. 0.**	**£2. 0. 0.**	**£2. 0. 0.**	m

CP-870

GOGGLES, full view, flexible plastics with perforated vents and an adjustable elastic headband. **Can be used over corrective spectacles.**
Dozen pairs **£8. 5. 0.** Pair **£0. 15. 0.** c

REPLACEMENT PART

CP-872 **Lenses,** one-piece cellulose acetate, 1·0 mm thick.
Dozen **£2. 15. 0.** Each **£0. 5. 10.** c

CP-880

FACE SHIELD, with replaceable non-inflammable clear plastics visor, 15 cm deep, fitted to fibre head support by a swivel attachment which allows the visor to be easily raised clear of the face. The soft leather padded head support is attached to an adjustable elastic headband.
Dozen **£17. 10. 0.** Each **£1. 12. 0.** c

REPLACEMENT PARTS

CP-882 **Visor,** plastics, 20 cm deep, for above.
Dozen **£9. 0. 0.** Each **£0. 16. 6.** c

CP-884 **Visor,** plastics, 15 cm deep, for CP-880.
Dozen **£6. 15. 0.** Each **£0. 12. 3.** c

CP-890

LIGHTWEIGHT SAFETY SPECTACLES, with durable black nylon frames and removable ventilated side shields. Fitted with clear, domed, safety toughened glass lenses. Supplied in plastics case.
Dozen pairs **£14. 10. 0.** Pair **£1. 6. 6.** *m*

ACCESSORIES

CP-892 **Lenses, heatsaver,** for protection against excessive infrared and ultraviolet ... ... Pair **£1. 3. 6.** *m*

CP-894 **Lenses, anti-glare,** *Chance* ON 12 didymium oxide glass for general glassblowing work ... Pair **£4. 2. 0.** *m*

RESPIRATORS

CP-898

FACE MASK, disposable, strong absorbent paper with stitched elastic ear loops. Supplied folded and when in use can be opened out to fit comfortably over the respiratory orifices. ... Pack of 100 **£1. 2. 0.** *m*

CP-900

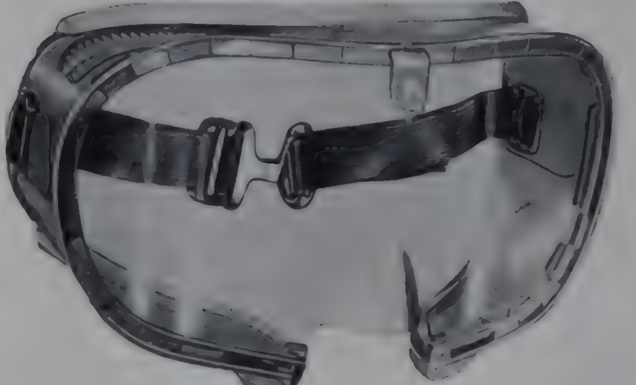
RESPIRATOR, flannel, with wire supports and double elastic headband.
Dozen **£2. 4. 0.** Each **£0. 5. 0.** c

CP-920

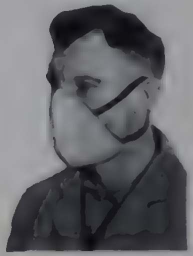
RESPIRATOR, moulded rubber body with 65 mm dia. black anodised aluminium screw retainer and one filter CP-924, or as specified by the customer when ordering. Fitted with two relief valves and an adjustable elastic headband.
Dozen **£14. 5. 0.** Each **£1. 6. 0.** c

CP-865

CP-880


CP-870

CP-890


CP-900

CP-898

CP-920

ACCESSORIES for CP-920

CP-922 **Filters,** set of three, in box.
Dozen Sets **£9. 0. 0.** Set **£0. 16. 6.** c

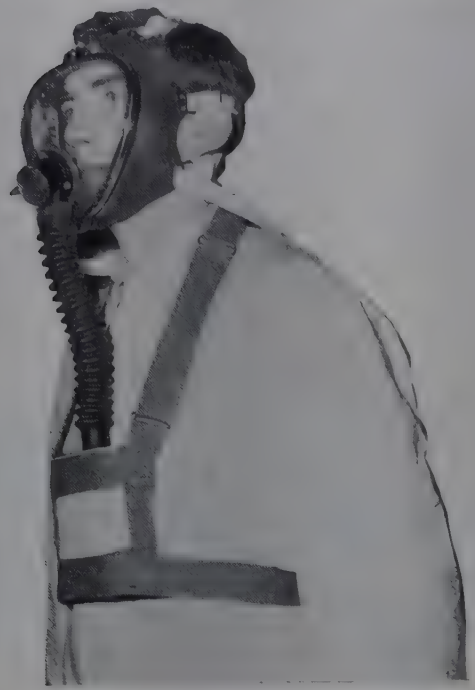
CP-924 **Filter, yellow spot,** for protection against low concentrations of toxic dusts.
Dozen **£2. 19. 0.** Each **£0. 6. 2.** c

CP-926 **Filter, red spot,** for protection against paint vapour and particles ... Dozen **£2. 19. 0.** Each **£0. 6. 2.** c

CP-928 **Filter, green spot,** for protection against low concentrations of organic vapours and acid gases.
Dozen **£2. 19. 0.** Each **£0. 6. 2.** c

All items on this page normally available from stock.

GAS RESPIRATORS



CP-968

The *Puretha* respirator can be worn comfortably for long periods to provide complete protection against various toxic gases, vapours and dusts according to the canister selected.

A wide vision clear plastics window is mounted in a flexible moulded rubber face mask which can be perfectly fitted to any size or shape of face by means of six adjustable elastic straps.

The canister of chemical absorbent, supported by an adjustable sling, is connected to the face mask by flexible corrugated tubing. The inlet valve is arranged so that inspired air is deflected over the inside of the window to avoid condensation. Inlet and outlet valves are readily accessible for adjustment. A light strong fibre case with carrying handle is available to contain the complete respirator.

The respirator is suitable for use only with low concentrations of gas in open working conditions. It is not suitable for use in confined spaces where the atmosphere may be deficient in oxygen.

CP-968
RESPIRATOR, *Puretha*, as specification, complete with **small** front canister sling, fibre carrying case, and instructions but **without canister** ... Each **£9. 15. 0.** *m*

CANISTERS, small, for CP-968

List No.	Canister type	Canister colour code	Protection against	Each	
CP-970	A	Blue *	Ammonia	**£1. 9. 6.**	*m*
CP-971	NF	Orange *	Nitrous fumes	**£1. 9. 6.**	*m*
CP-972	D	White *	Hydrogen cyanide	**£1. 9. 6.**	*m*
CP-973	CG	Red†	Acid gases excluding hydrogen cyanide	**£1. 9. 6.**	*m*
CP-974	SH	Red/white†	Acid gases including hydrogen cyanide, also sulphur oxides and hydrogen sulphide	**£1. 12. 0.**	*m*
CP-975	C	Black†	Organic compounds boiling above 60°C, acetaldehyde, acetone, carbon disulphide, diazomethane, diketene, ether, ethylene oxide, formaldehyde, halogens and halogen acids, ketene, petroleum, phosgene, sulphur oxides and chloride, sulphuryl and thionyl chlorides ...	**£1. 9. 6.**	*m*

CP-978
RESPIRATOR, *Puretha*, as specification, complete with **large** front canister sling, fibre carrying case, and instructions but **without canister** ... ... Each **£9. 5. 0.** *m*

CANISTERS, large, for CP-978

List No.	Canister type	Canister colour code	Protection against	Each	
CP-981	NFC	Orange/grey†	As CP-971 (NF) and fine smokes and dusts	**£2. 1. 0.**	*m*
CP-983	CGC	Red/grey†	As CP-973 (CG) and fine smokes and dusts	**£2. 1. 0.**	*m*
CP-984	SHC	Red/white/grey †	As CP-974 (SH) and fine smokes and dusts and acetone cyanhydrin ...	**£2. 1. 0.**	*m*
CP-985	CC	Black/grey *	As CP-975 (C) and fine smokes and dusts, also isocyanates, hydrazine and tetraethyl lead	**£2. 1. 0.**	*m*
CP-986	CCI	Black/grey/grey †	As CP-985 (CC) and mercury vapour	**£2. 1. 0.**	*m*
CP-990	O	Black/orange *	As CP-975 (C) also ethyl, methyl, methylene, vinyl, vinylidene and cyanogen chlorides, methyl bromide	**£2. 12. 0.**	*m*

* Approved canisters to BS 2091 Table 1. † Approved canisters to H.M. Factory Inspectorate regulations.

All items on this page normally available from stock.

COAL AND COKE TESTING APPARATUS

Apparatus for use in coal and coke testing laboratories is listed throughout the catalogue. The following is a summary of the more important items, many of which meet the requirements of British Standards 1016 and 1017. For full details and prices see entries in List No. sequence.

CB-100 Adiabatic Bomb Calorimeter, *Gallenkamp*, for calorific value determinations to BS 1016.

FS-320 Tube Furnaces, *Gallenkamp*, for the determination of C, H_2, S and Cl_2 to BS 1016.

FS-400 Tube Furnace, *Gallenkamp*, for fusibility tests on coal and coke ash.

FS-530 Muffle Furnaces, *Gallenkamp*, high and low temperature, for determination of ash content to BS 1016.

FS-560 Muffle Furnaces, *Gallenkamp*, and accessories for determination of volatile matter to BS 1016.

MU-282 Grinding Mill, for preparation of samples.

MV-470 Minimum Free Space Oven, *Gallenkamp*, for moisture determinations to BS 1016.

BH-185 Aluminium Dishes for moisture determinations.

MV-600 Vacuum Drying Oven, *Gallenkamp*.

SA-600 Riffle Sample Divider to BS 1017.

GC-120 Orsat Gas Analyser, *Gallenkamp*, for O_2, CO_2, CO, H_2, and CH_4 determinations in flue gases.

GC-300 Haldane Gas Analyser, *Gallenkamp*, for O_2, CO_2, CO, H_2 and CH_4 determinations in flue gases.

GC-400 Lloyd Gas Analyser, *Gallenkamp*, for rapid O_2, CO_2, CO, H_2 and CH_4 determinations in flue gases.

CB-100

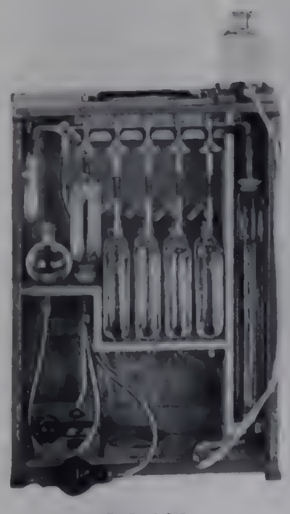
FS-320

FS-400

FS-530

FS-560

MV-470


GC-120

GC-400

Gallenkamp COLORIMETER

Gallenkamp COLORIMETER

CS-200

For a wide range of colorimetric determinations in:

CLINICAL and BIOCHEMICAL ANALYSIS. Blood, urine, body fluids etc.

FOOD CHEMISTRY. Analysis and quality control.

ANALYTICAL CHEMISTRY. Inorganic and organic analysis.

AGRICULTURAL CHEMISTRY. Soil analysis.

METALLURGY. Iron, steel and non-ferrous metal analysis.

- **Transistorised stabiliser circuit**
- **Rapid response—stable readings**
- **Simple to operate and maintain**
- **Optional flowthrough cell**
- **Mirror scale meter—reads optical density direct**
- **Polypropylene 3-position cell holder**
- **Robust unitised construction**

CONSTRUCTION

The colorimeter is designed so that all sub-assemblies are readily accessible and lamp and photocell may easily be replaced.

Lamp and power supply. The lamp, which is energised by a stabilised supply, is a 6V, 1A prefocus type, under-run at 5·5V for long life. Over 60% of its light output is utilised, an anodised aluminium reflector being used for maximum efficiency. To reduce heating effects by radiation to a minimum, a *Chance* HA1 filter is interposed between the lamp and the filter. The lamp assembly is readily accessible for replacement of lamps. **Processed lamps CS-208 only should be used for replacement purposes.**

Light filters. The colour filters used are the internationally known *Ilford* Bright Spectrum series of narrow bandpass filters. The instrument has, using these, adequate reserve sensitivity for blanks of optical density up to 0·4 and even higher to be used.

Sample holder. A 3-position polypropylene sample holder indexes accurately so that any of the three test cells may rapidly be moved into the test position. Normally 10 mm light path rectangular cuvettes are used, but test tube adapters are available and also the flowthrough cell fits the holder. A drain beneath the holder prevents collection of spillage within the instrument.

Photocell and shutter. Deleterious effects of aggressive atmospheres and chemical vapours are minimised by the use of an epoxy resin encapsulated barrier layer photocell which is readily accessible for replacement purposes. Sensitivity control is by means of a mechanical shutter, in order that brisk meter response is maintained at all settings.

Meter. An 11·5 cm scale length meter with anti-parallax mirror scale is fitted. This meter is flush fitting to avoid dust traps and has an antistatic window to eliminate errors due to static electricity attracting the pointer.

DIMENSIONS AND WEIGHT

	H W D
Overall	17 × 21 × 35 cm
Weight, net	7·3 kg

Gallenkamp COLORIMETER

REGD TRADE MARK

PERFORMANCE AND OPERATION

The colorimeter compares photoelectrically the optical densities of solutions of coloured substances with the optical densities of their solvents. From this comparison it is possible to estimate the solution concentration because with most dilute solutions, concentration is proportional to optical density.

Careful design of the instrument has ensured that the results obtained are as accurate as colorimetric methods permit.

Accuracy. The instrument gives results of an order of accuracy of 1% by direct reading. For most tests, however, it is recommended that a calibration curve (optical density against concentration) be drawn, from which more precise estimates of concentration may be derived.

Stability. Total drift over long periods is well within 0·005 o.d. units. The transistorised stabiliser circuit virtually eliminates the effects of mains supply voltage and frequency fluctuations. (A 10% variation in mains voltage produces a change in reading of less than 0·005 o.d. units; a ± 5 Hz variation in mains frequency produces a change in reading of less than 0·006 o.d. units).

Sample heating. Over a two hour period the sample heats up by only about 5°C.

Flowthrough cell. For multiple, routine testing of similar samples, the flowthrough cell is recommended. With this, up to four tests per minute may comfortably be performed.

CS-200

COLORIMETER, PHOTOELECTRIC, *Gallenkamp*, as specification, with dust cover but **without** colour filters or test cells. For 100/130V and 200/250V 50 Hz single phase supplies ... ... Each **£68. 0. 0.** *b*

CS-205

COLORIMETER OUTFIT, *Gallenkamp*, comprising one CS-200 colorimeter, one each colour filters CS-212, CS-215 and CS-218, and three test cells CS-250. Each **£75. 10. 0.** *b*

When ordering please state voltage and nature of supply.

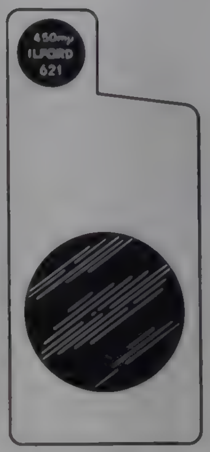
Instrument can be supplied for battery operation—prices on application.

NOTE: The filters supplied are those most commonly used in clinical work. Any other combination of three filters may be selected from the table under Accessories.

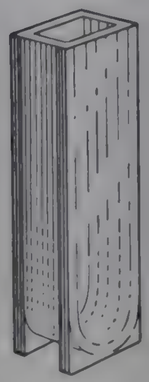
REPLACEMENT PARTS

CS-208	**Lamp,** 6V, 1A, prefocus, specially processed.	Each £0. 15. 0.	*b*
CS-209	**Photocell**	Each £2. 1. 0.	*m*

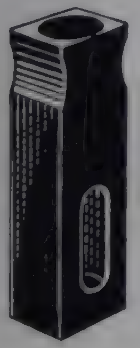
When ordering replacement parts please state serial number of colorimeter and supply voltage.



CS-211 to CS-218



CS-250



CS-260

CS-270

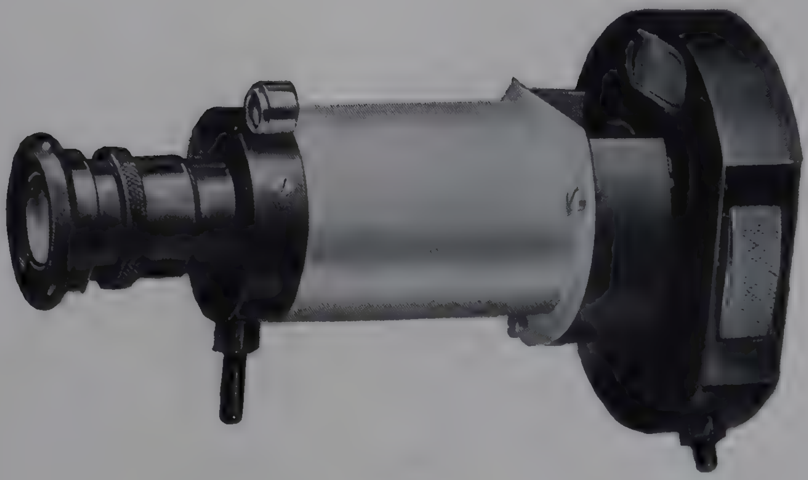
ACCESSORIES

Filters, *Ilford*, in plastics mount.

List No.	*Ilford* No.	Colour	Peak trans-mission mμ	Each	
CS-211	621	Bright Spectrum Violet	450	£1. 8. 0.	*m*
CS-212	622	Bright Spectrum Blue	470	£1. 8. 0.	*m*
CS-213	623	Bright Spectrum Blue-Green	490	£1. 8. 0.	*m*
CS-214	624	Bright Spectrum Green	520	£1. 8. 0.	*m*
CS-215	625	Bright Spectrum Yellow-Green	540	£1. 8. 0.	*m*
CS-216	626	Bright Spectrum Yellow	570	£1. 8. 0.	*m*
CS-217	607	Spectrum Orange	600	£1. 8. 0.	*m*
CS-218	608	Spectrum Red	670	£1. 8. 0.	*m*

CS-230	**Filter,** *Chance* **HAI,** heat absorbing glass, in plastics mount. Recommended for use with filters which are heat sensitive and especially with filter CS-218 to reduce the infrared light incident on the photocell.	Each £1. 7. 6.	*b*
CS-240	**Filter,** *Keeler*, neutral density, glass in plastics mount. Has stated optical density of approximately 0·48 through filter CS-215. Approximately equivalent to 10 mm of a 1 in 200 dilution of blood of 14·6 g Hb% ...	Each £5. 12. 0.	*m*
CS-250	**Test cell,** fused glass, 10 mm optical depth, capacity 6 ml.	Each £1. 3. 0.	*b*
CS-252	**Test cells, matched set of three cells** CS-250.	Set £3. 12. 6.	*b*
CS-255	**Rack,** bakelite, to hold 6 test cells CS-250.	Each £2. 8. 0.	*b*
CS-260	**Adapter, test tube,** to hold tubes CS-270 in colorimeter CS-200	Each £0. 8. 9.	*b*
CS-265	**Adapters, test tube,** as CS-260 but matched set of three, numbered and marked	Set £1. 15. 0.	*b*
CS-270	**Test tube,** 10 mm internal diameter, 75 mm long, selected for uniform internal diameter. ...	Dozen £0. 8. 9.	*c*
CS-275	**Test tubes,** set of twelve tubes, CS-270 marked at uniform transmission point... ...	Set £1. 6. 6.	*m*
CS-280	**Rack,** plastics, to hold nine test tubes CS-270 and three adapters CS-260	Each £2. 14. 0.	*b*
CS-282	**Flowthrough cell,** as specification, comprising cylindrical glass cell in holder, plastics connecting tubing and squeeze bottle for emptying	Each £2. 7. 0.	*b*
CS-283	**Flowthrough cell,** in holder only.	Each £1. 8. 0.	*b*

All items on this page normally available from stock.



CS-320

PHOTOMETER

MRC GREY WEDGE PHOTOMETER

Although primarily designed to measure the haemoglobin content of blood, this instrument may be used to measure many other constituents of blood, urine and CSF.

PRINCIPLE

The optical density of a coloured liquid is compared with a standard grey wedge by elimination of colour differences with a colour filter. A double light path is viewed on a screen and the two halves, one sample and one reference, are brought to coincidence of brightness. This is achieved by adjusting the position of the annular wedge which in turn alters the amount of light in the reference beam. Readings are taken on the scale graduated directly in percentage Haldane, with ready conversion to optical density and gm/ml haemoglobin. Simple calculation enables such readings to be converted when measuring factors other than haemoglobin.

CS-320

PHOTOMETER, GREY WEDGE, MRC, for daylight viewing as specification, with two optical cells, three mounted colour filters, a neutral standard for checking accuracy and reagents. In fitted case with lighting attachment for 110 or 230V 50 Hz supplies.
Each **£60. 0. 0.** *f*

CS-322

CELLS, optical, for above photometer.
Each **£1. 9. 0.** *f*

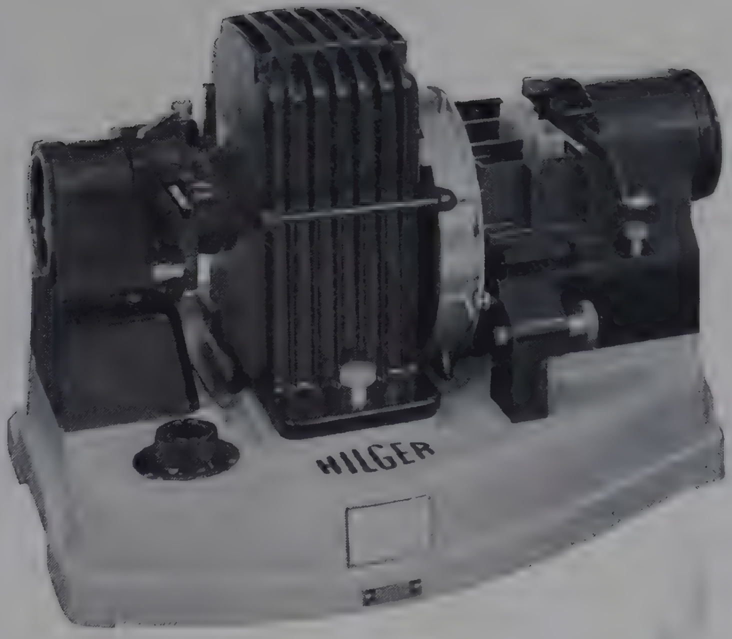
When ordering please state voltage and nature of supply.

SPEKKER ABSORPTIOMETER AND FLUORIMETER

A versatile instrument having a central light source and two photocells. Filters are used to isolate fairly narrow bands of the spectrum. The sample is placed in one light path and a shutter in the other can be adjusted until the photocell outputs are balanced as indicated by a spot galvanometer. Optical density from 0 to 1·3 is read on a 40 cm scale.

With a pair of neutral filters the Spekker may also be used for turbidimetry.

The fluorimeter measures the intensity of fluorescence of a sample relative to that of a standard. It has a mercury vapour lamp and a photomultiplier. The fluorimeter can be readily converted to the absorptiometer, and vice versa, by using interchangeable parts.



CS-330 without galvanometer

CS-330

ABSORPTIOMETER, Spekker, *Hilger & Watts*, with one set of Kodak spectrum filters in case, one pair of neutral filters, two each ½ cm, 1 cm and 4 cm test cells, one spare lamp, and spot galvanometer, for single phase a.c. supplies only ... ... Each **£209. 15. 0.** *fN*

CS-332

FLUORIMETER, Spekker, *Hilger & Watts*, with photomultiplier and supply unit, two fluorimetry cells, one pair of Wratten No. 47 filters, one set of *Chance* glass filters and spot galvanometer, for single phase a.c. supplies only ... ... Each **£427. 6. 0.** *fN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

CS-334	**Test cells.**					
	Light path	1	2	4 cm		
	Each	all **£3. 0. 0.**				*m*
CS-336	**Lamp**				Each **£1. 5. 0.**	*m*
CS-338	**Lamp,** mercury vapour				Each **£4. 5. 0.**	*fN*

Details of other accessories and replacement parts will be sent on request.

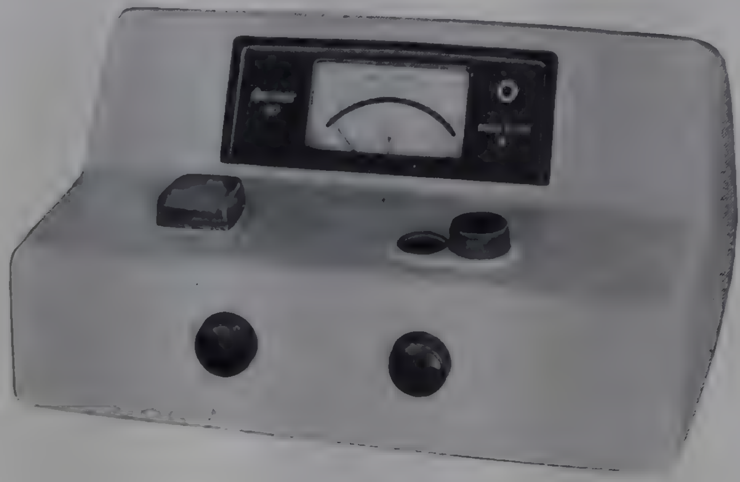
Items on this page normally available from stock except those coded *N*.

SPECTRONIC 20 COLORIMETER-SPECTROPHOTOMETER

The Spectronic 20 Colorimeter-Spectrophotometer employs a *Bausch and Lomb* 'Certified-Precision' diffraction grating, giving a constant band-pass of 20 mμ over the entire instrumental range of 340–950 mμ. Any section of this range can be selected with a calibrated dial; work in the near infra-red region of 650–950 mμ necessitates insertion of a red sensitive photocell and a red filter, a simple operation. The photocell and the lamp are plugged in and may be changed without recalibration.

Samples are inserted in selected test tubes or cuvettes, and an automatic shutter, operated by removal of the sample, protects the phototube and provides continual zero checks. The zero and 100% transmittance adjustments are readily made by two separate controls, and transmittance or absorbance can then be read directly on a mirrored scale.

For colorimetric work the instrument provides direct reading of optical density at any desired wavelength, and the narrow band-pass made possible by the diffraction grating enables Beer's law to be obeyed almost as exactly as for absolute monochromatic light. The instrument can also be employed as a spectrophotometer, so that absorbance curves can be plotted over the entire range.


CS-360

***CS-360**
COLORIMETER-SPECTROPHOTOMETER, SPECTRONIC 20 transistorised regulated model range 340 to 650 mμ, supplied with twelve 11·6 mm internal diameter selected test tubes and test tube adapter, directions for use and a plastics dust cover. Complete with transformer for 200/240V 50/60 Hz supplies.
Each **£182. 0. 0.** *f*

ACCESSORIES

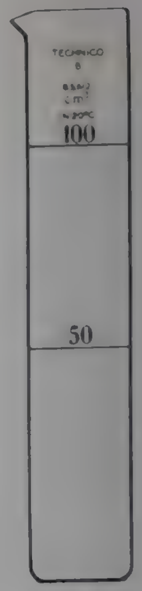
***CS-362**	**Red-sensitive photocell** ... for work in 650–950 mμ region	Each	£2. 14. 0.	*f*
***CS-364**	**Red filter** ... for work in 650–950 mμ region	Each	£0. 18. 0.	*f*
***CS-366**	**Test tubes,** selected 11·6 mm ...	Dozen	£3. 3. 6.	*f*
***CS-368**	**Cuvettes**	Pair	£6. 15. 8.	*f*
***CS-373**	**Clinical methods manual** with 35 methods	Each	£5. 7. 6.	*f*
***CS-376**	**Industrial methods manual** with methods for aluminium, steel, copper and gold alloys.	Each	£8. 16. 6.	*f*
***CS-378**	**Colour analyser** attachment ...	Each	£306. 0. 0.	*f*

REPLACEMENT PART

***CS-380**	**Spare lamp**	Each	£1. 4. 0.	*f*

NESSLER CYLINDERS

TECHNICO
50
CS-450



CS-455

CS-450
CYLINDERS, Nessler, *Technico,* to BS 612, with mark at 50 cm^3. Lead free glass, with polished bottoms. Available in pack of 6 with marks all one height ±1 mm.
Pack of six **£2. 2. 0.** *aS*

CS-455
CYLINDERS, Nessler, *Technico,* as CS-450 but with marks at 50 and 100 cm^3. Available in packs of 6 with height of corresponding marks ±1 mm.
Pack of six **£2. 12. 0.** *aS*

CS-470
CYLINDERS, Nessler, *Emil,* to BS 612, made from tubing with shadowless base. One mark at 50 cm^3, in pairs matched ±1 mm.
Dozen pairs **£5. 18. 0.** Pair **£0. 10. 10.** *mS*

CS-472
CYLINDERS, Nessler, *Emil,* as CS-470 but with 2 marks at 50 and 100 cm^3, in pairs matched ±1 mm.
Dozen pairs **£7. 6. 0.** Pair **£0. 13. 4.** *mS*

CS-480
STAND, for six 50 cm^3 **Nessler** cylinders, black painted hardwood, with opal glass base ... Each **£1. 5. 0.** *cS*

CS-485
STAND, as CS-480 but to take six 100 cm^3 **Nessler** cylinders ... ... Each **£1. 7. 0.** *cS*

CS-480

Items on this page coded *S* **normally available from stock.**

BDH LOVIBOND NESSLERISER

CS-502

NESSLERISER, *BDH* **Lovibond,** for colorimetric tests. This instrument is based on the same principle as the Lovibond comparator, (see page 166) but permits the analysis of more dilute solutions by the use of greater depths of liquids. The moulded body holds the disk, containing nine permanent colour standards, which revolves in a compartment above two Nessler cylinders, one containing the test solution and the other a compensating 'blank'. Complete with two Nessler cylinders but without disk Each **£8. 12. 6.** *f*

REPLACEMENT PART

CS-505	**Nessler cylinders**	Pair	**£0. 12. 6.**	*f*

ACCESSORY

CS-510	**White light cabinet**	Each	**£11. 10. 0.**	*f*

DISKS pH, for Nessleriser CS-502. Each disk has 9 colour standards. Complete in plastics case with 25 ml dropping bottle of indicator.

List No.	Code	pH Range	Indicator	Each	
CS-520	NLM	1·2—2·8 in steps of 0·2	Thymol blue	**£4. 17. 0.**	*f*
CS-522	NLN	2·8—4·4 ,, ,,	Bromophenol blue	**£4. 17. 0.**	*f*
CS-528	NLL	4·4—6·0 ,, ,,	Methyl red	**£4. 17. 0.**	*f*
CS-534	NLC	6·0—7·6 ,, ,,	Bromothymol blue	**£4. 17. 0.**	*f*
CS-542	NLK	7·6—9·2 ,, ,,	*m*–Cresol purple	**£4. 17. 0.**	*f*
CS-544	NLF	8·0—9·6 ,, ,,	Thymol blue	**£4. 17. 0.**	*f*
CS-550	NLH	4·0—11·0 in steps of 1·0	*BDH* Universal	**£4. 17. 0.**	*f*

CS-502

DISKS, for ammonia analysis by Nessler's reagent method, for use with Nessleriser CS-502. Each disk has 9 standards in graded steps.

List No.	Code	Range	Each	
CS-562	NAA	1— 10 μg	**£4. 10. 0.**	*f*
CS-564	NAB	10— 26 μg	**£4. 10. 0.**	*f*
CS-566	NAC	28— 60 μg	**£4. 10. 0.**	*f*
CS-568	NAD	60—100 μg	**£4. 10. 0.**	*f*

DISKS, for chlorine in water analysis, for use with Nessleriser CS-502. Each disk has 9 standards in graded steps and is supplied in plastics case with 25 ml dropping bottle of acid o–tolidine reagent.

List No.	Code	Range	Each	
CS-576	NCA	0·01—0·09 ppm	**£4. 10. 0.**	*f*
CS-578	NCB	0·1 —0·5 ppm	**£4. 10. 0.**	*f*
CS-580	NCAB	0·02—0·5 ppm	**£4. 10. 0.**	*f*

CS-612

DISK, for oxygen in boiler water, Code NOE by indigo carmine method with 9 standards in graded steps covering range 0—0·12 ml/litre. For use with Nessleriser CS-502 using cylinder CS-613 ... Each **£4. 10. 0.** *f*

CS-613

Cylinder, modified, for indigo carmine test. Each **£2. 12. 6.** c

All items on this page normally available from stock.

LOVIBOND TINTOMETER

Lovibond permanent glass colour standards mounted on movable racks are fitted in a moulded plastics case which supports a viewing tube fitted with two 45° mirrors. These mirrors reflect the light entering through two apertures at the back of the case to the eyepiece fitted at the top of the tube. In front of one aperture is placed the sample which is contained in a glass cell or powder holder. The other aperture receives the light from the white light cabinet which is similar to North daylight. The racks are manipulated until the colours and intensities of the lights when viewed through the eyepiece are matched and the Lovibond readings are recorded.

The essential differences in the sets below are in the selection of Lovibond glass colour standards and the number and size of glass cells and accessories.

Special consideration is given to making sets to meet customers requirements for matching liquids or solids.

CT-004

TINTOMETER, Standard Model AF 700, for general laboratory and works use on liquids or solids of light to medium colour. Complete with 10 mm and 1 in cells, 60 colour filters and 12 neutral tints. Each **£160. 0. 0.** *f*

CT-006

TINTOMETER, Universal Model AF 702, as CT-004 but with 12 extra colour filters to extend range to deeper colours, e.g. paints, inks, cosmetics etc.
Each **£195. 0. 0.** *f*

CT-016

TINTOMETER, Model AF 704, for undyed motor spirits and similar petroleum products, to IP 17. With 14 IP colour standards and 18 in cell. Each **£98. 0. 0.** *f*

CT-042

TINTOMETER, Model AF 710, for vegetable oils using the AOCS red scale. With 42 colour standards and two sample tubes graduated at 1 in and 5¼ in depth.
Each **£150. 0. 0.** *f*

CT-043 **Sample tube, spare for above, with two graduation marks** ... ... Each **£0. 15. 0.** *f*

CT-072

CELLS, fused glass, for liquid samples.

Light path	6	5¼	5	4	3	2 in	
Each	**56/–**	**56/–**	**56/–**	**50/–**	**40/–**	**40/–**	*f*

Light path	1	½	¼	⅛	1/16 in	
Each	**28/–**	**28/–**	**28/–**	**28/–**	**40/–**	*f*

CT-073

CELLS, fused glass, for liquid samples.

Light path	40	33	30	25	20 mm	
Each	**40/–**	**35/6**	**35/6**	**28/–**	**28/–**	*f*
Light path	15	13	10	5	2·5 mm	
Each	**28/–**	**28/–**	**28/–**	**28/–**	**28/–**	*f*

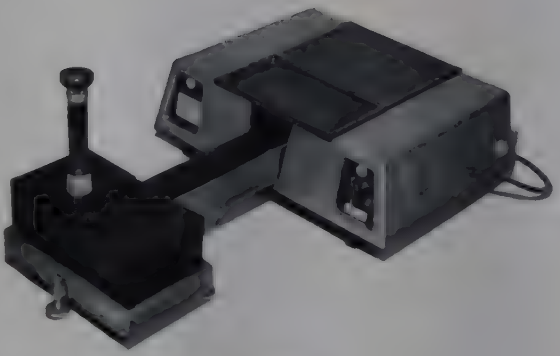
CT-076

CELLS, borosilicate glass, for water white liquids.
Light path 18 in ... ... Each **£5. 0. 0.** *f*

CT-077

LIGHT SHIELD, for 18 in cell CT-076.
Each **£2. 10. 0.** *f*

CT-004



CT-016

CT-042

CT-084

PLATFORM, adjustable, for holding 18 in cells CT-076.
Each **£4. 10. 0.** *f*

CT-088

LAMPS, 60W, selected pair for Lovibond Tintometers.
Pair **£0. 9. 0.** *f*

When ordering please state voltage required.

CT-096

WHITE LIGHT CABINET, complete with two lamps, two magnetic chucks, two magnesium carbonate blocks, porcelain tray, presser and frame for powders, book of analysis forms and separate accessories box.
Each **£28. 10. 0.** *f*

For lubricating oils to ASTM D1500—IP 196 see Seta-Lovibond comparator PE-340 in List No. sequence

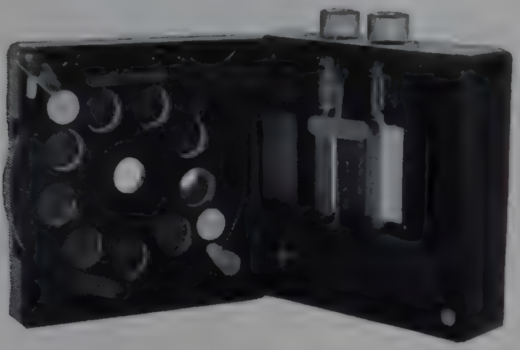
LOVIBOND COMPARATORS

The Lovibond Comparator comprises a plastics housing into which can be fitted a disk of permanent colour standards together with two glass containers, one for the specimen under test and the other for a blank (to compensate for inherent colour in a sample).

Each particular test requires the use of the appropriate disk which contains a number of permanent glass colour standards (usually 9) representing the range of colours produced by different concentrations of the material which is the subject of the test.

For moderate accuracy the 13·5 mm dia. test tubes CT-250 are used as sample and blank containers. For higher accuracy rectangular glass cells CT-280 are necessary. Choice of light path depends on the optical density of the sample of colour to be measured.

The comparator is designed for use in North light. In bad lighting conditions the white light cabinet CT-210 should be used.



CT-200
with disk and test tubes CT-250

CT-210

CT-244

CT-200

COMPARATOR, Lovibond, standard plastics housing to accommodate a colour standard disk and two 13·5 mm test tubes or two glass cells up to 13·5 mm light path. **Without tubes, cells or disks** ... Each **£3.15. 0.** *f*

A special comparator to accommodate cells of light path up to 40 mm is available. Details on request.

CT-210

WHITE LIGHT CABINET, providing a source of corrected white light for Lovibond comparators in conditions when available natural light is unsuitable. A daylight correction blue glass filter is provided. Each **£11.10. 0.** *fN*

When ordering please state voltage and nature of supply.

CT-230

COMPARATOR, Lovibond, special purpose, for viewing opaque liquids by reflected light as required by the resazurin milk test. **Without cells, tubes or disks.** Each **£9.10. 0.** *f*

For resazurin cell and disk see CT-266 and CT-535 in List No. sequence.

CT-244

COMPARATOR pH OUTFIT, Lovibond, general purpose. For pH measurement of coloured solutions over the range from 2·8 to 10·0 in steps of 0·2. Comprises comparator CT-200, six test tubes CT-250, five standard disks, and five 25 ml dropping bottles of indicators in fitted case ... ... Each **£31.15. 0.** *fN*

ACCESSORIES

CT-250

TEST TUBE, 13·5 mm dia., ringed at 10 ml. Each **£0. 3. 6.** *f*

CT-252

TEST TUBE, but graduated 4, 5, 6, 7, 8, 9 and 10 ml. Each **£0. 7. 6.** *f*

CT-260

TEST TUBE, 13·5 mm dia. but double length capacity 20 ml for use in titrating solutions to a required pH value. Each **£0. 6. 6.** *f*

CT-266

TEST TUBE, to BS 625, graduated 10 ml. For the resazurin test ... ... Each **£0. 2. 6.** *f*

CT-280

CELLS, optically flat, rectangular, fused glass.

Depth	2·5	5	10	13·5 mm	
Each	**28/–**	**28/–**	**28/–**	**28/–**	*f*

For disks see opposite page.

Items on this page normally available from stock except those coded *N*.

LOVIBOND COMPARATOR DISKS

The following list is a selection of disks most frequently used. A wide range of disks is available, and we shall be pleased to quote for others on application.

DISKS, for pH, for use with comparator CT-200. Each disk has 9 standards covering the listed range. Complete in plastics case with 25 ml dropping bottle of indicator. Items marked † have a dulling screen included.

List No.	Code	Test	pH Range	Remarks	Price	
CT-356	2/1A	Thymol blue	1·2 — 2·8	In steps of 0·2 pH	£4. 17. 0.	f
CT-358	2/1B	Bromophenol blue	2·8 — 4·4	„ „ „	£4. 17. 0.	f
CT-362	2/1C	Bromocresol green	3·6 — 5·2	„ „ „	£4. 17. 0.	f
CT-368	†2/1E	Methyl red	4·4 — 6·0	„ „ „	£4. 17. 0.	f
CT-374	2/1H	Bromothymol blue	6·0 — 7·6	„ „ „	£4. 17. 0.	f
CT-376	†2/1J	Phenol red	6·8 — 8·4	„ „ „	£4. 17. 0.	f
CT-384	2/1L	Thymol blue	8·0 — 9·6	„ „ „	£4. 17. 0.	f
CT-394	2/1P	*BDH* Universal	4·0 — 11	In steps of 1·0 pH	£4. 17. 0.	f

DISKS, for quantitative chemical analysis, for use with comparator CT-200. Each disk has 9 standards covering the listed range. Items marked † have a dulling screen included.

List No.	Code	Test	Range	Remarks	Price	
CT-424	3/2A	Chlorine in water	0·1 — 1·0 ppm	Acid *o*-tolidine method	£4. 10. 0.	f
CT-426	3/2AB	„ „	0·15 — 2·0 ppm	„ „ „	£4. 10. 0.	f
CT-432	3/2APC	„ „	1·0 — 5·0 ppm	„ „ „ for 5 mm cell	£4. 10. 0.	f
CT-454	3/5	Copper	2·5 — 50 μg	Sodium diethyl dithio carbamate	£4. 10. 0.	f
CT-466	3/11	Iron	2 — 25 μg	Thiocyanate	£4. 10. 0.	f
CT-480	†3/32	Nitrogen as Nitrate	1 — 9 ppm N	Brucine	£4. 10. 0.	f
CT-490	3/12	Phosphate in boiler water	0 — 80 ppm	Hydroquinone method	£4. 10. 0.	f

DISKS, grading, for comparator CT-200. Each disk has 9 standards covering the listed range unless otherwise stated.

List No.	Code	Test	Range	Remarks	Price	
CT-524	4/15A 4/15B	Gardner scale	1 — 18 units	Oils and varnishes. 2 disks. CT-280 10 mm cell needed	£9. 0. 0.	f
CT-528	4/11 Bleach	Bleached shellac	⅜ — 1¾ „	Paint Research Station scale CT-280 10 mm cell needed	£4. 10. 0.	f
CT-530	4/11A	Shellac	2 — 6 „		£4. 10. 0.	f
CT-532	4/11B	„	6¼ — 9 „		£4. 10. 0.	f
CT-535	4/9	Resazurin milk test	7 arbitrary standards	Min. of Agriculture test Requires CT-230 and tubes CT-266	£4. 10. 0.	f

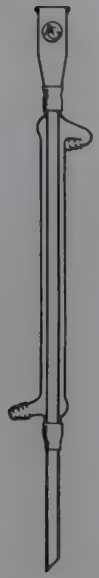
DISKS, clinical and biochemical, for use with comparator CT-200. Each disk has 9 standards covering the listed range.

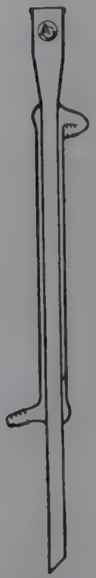
List No.	Code	Test	Range mg/100 ml	Remarks	Price	
CT-598	5/2A	Sugar in blood	60 — 220	Modified Folin Wu	£4. 10. 0.	f
CT-600	5/2B	„ „	240 — 400		£4. 10. 0.	f
CT-618	5/9A	Urea in blood	20 — 100	Archer & Robb's urease	£4. 10. 0.	f
CT-620	5/9B	„ „	110 — 220	„ „ „	£4. 10. 0.	f

All items on this page normally available from stock.

AG CONDENSERS

Regd


CU-320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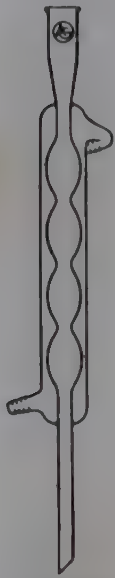
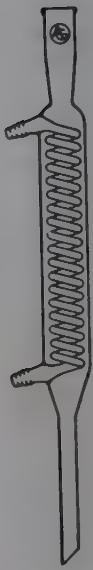

CU-340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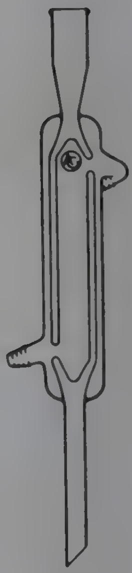
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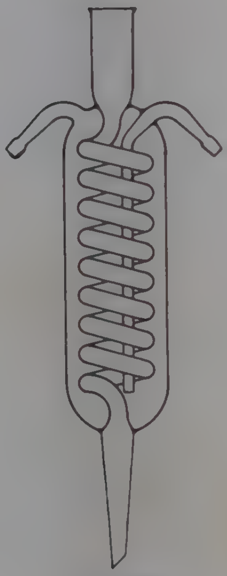
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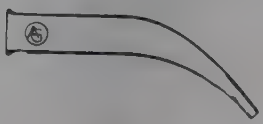

CU-400

COLUMNS, chromatography see CHROMATOGRAPHY and *Quickfit* APPARATUS
fractionating see DISTILLATION APPARATUS and *Quickfit* APPARATUS
COMBUSTION,
boats see BOATS
furnaces see FURNACES
tubes see TUBES
COMPENSTAT see THERMOREGULATION
COMPRESSORS see AIR PUMPS

CU-320

CONDENSERS, AG Liebig, efficient narrow jacket with rubber connections, to BS 1848.

Length of jacket	25	50 cm	
Dia. of jacket	19–20	19–20 mm	
Dozen	**125/–**	**135/–**	a
Each	**11/3**	**12/3**	

CU-322 **Inner tubes** only for CU-320.

Length of jacket	25	50 cm	
Length of inner tube	45	70 cm	
Dia. of inner tube	12–13	12–13 mm	
Dozen	**46/–**	**54/–**	a
Each	**5/2**	**5/10**	

CONDENSERS, Kjeldahl, see NR-210, NR-212 in List No. sequence.

CU-330

CONDENSERS, AG Liebig, borosilicate glass, with narrow fused-on jacket, to BS 1848.

Length of jacket	25	50 cm	
Dia. of jacket	19–20	19–20 mm	
Dozen	**170/–**	**180/–**	a
Each	**15/6**	**16/6**	

CU-340

CONDENSERS, AG Allihn, borosilicate glass, fused-on jacket, to BS 1848.

Length of jacket	25	50 cm	
Dia. of jacket	35–37	35–37 mm	
Dozen	**245/–**	**310/–**	a
Each	**22/6**	**28/–**	

CU-350

CONDENSERS, AG Graham, borosilicate glass, with fused-in cooling spiral, to BS 1848.

Length of jacket	25	50 cm	
Dia. of jacket	35–37	35–37 mm	
Dozen	**300/–**	**420/–**	a
Each	**27/–**	**38/–**	

CU-360

CONDENSERS, AG Davies double-surface pattern, borosilicate glass. Recognised for more than 50 years as the most efficient glass condenser available at a modest price, and adopted for standardisation in BS 1848. A recent improvement in all *Gallenkamp* manufactured Davies condensers is a gradual taper at the lower end of the inner tube so that the condenser can be used in an inclined position without any liquid trap occurring at the shoulder.

Length of jacket	15	20	30 cm	
Approx. condensing surface	200	300	450 cm²	
Dia. of jacket	41–43	41–43	41–43 mm	
Dozen	**300/–**	**330/–**	**370/–**	a
Each	**27/–**	**30/–**	**34/–**	

CU-380

CONDENSER, AG Thorpe, Inland Revenue pattern, **borosilicate glass,** to BS 1848. Length of jacket 20 cm, dia. 63–67 mm.

Dozen **£27. 10. 0.** Each **£2. 10. 0.** a

CU-400

CONDENSER ADAPTERS, simple bent pattern.

Diameter	20	25 mm	
Dozen	**26/–**	**26/6**	a
Each	**3/8**	**3/9**	

All items on this page normally available from stock.

CONDENSERS

Regd.

CU-450

CONDENSER-STILLHEAD, Ⓐ **Jackson,** with 14/15 joints ... ... Dozen **£11. 0. 0.** Each **£1. 0. 0.** a

CU-452 **Inner tube,** for CU-450, with 14/15 cone. Each **£0. 7. 6.** a

CU-454 **Outer tube,** for CU-450, with 2 cones and socket 14/15. Each **£0. 12. 9.** a

CU-460

CONDENSER ADAPTER, Ⓐ, to provide vertical delivery from a condenser sloping at an angle of 30° to the horizontal. With 14/15 socket and delivery tube 100 mm long 8 mm in diameter with drip end, borosilicate glass. Dozen **£3. 6. 0.** Each **£0. 6. 8.** a

MW-098

CONDENSER, Liebig reflux, 20 cm with 14/23 cone joint

WJ-130

CONDENSER, Dean & Stark, to BS 756

For prices see entries in List No. sequence.

CONDENSERS, Davies double-surface pattern. See descriptive note on previous page.

CU-520

CONDENSERS, Ⓐ **Davies double surface,** with cone joint for reflux use, **borosilicate glass.**

Length of jacket	15	20 cm	
Cone	29/32	29/32	
Dozen	**380/–**	**400/–**	a
Each	**35/–**	**36/–**	

CU-530

CONDENSERS, Ⓐ **Davies double surface,** with cone joint for reflux use, **borosilicate glass.** These condensers on the larger size of standard joint are a very compact design in which the cone joint forms the lower portion of the outer jacket. Length of jacket 20 cm.

Cone	40/38	50/42	
Dozen	**450/–**	**550/–**	a
Each	**41/–**	**50/–**	

CU-550

CONDENSERS, Ⓐ **Davies double surface,** with cone and socket joint, **borosilicate glass.** Socket 19/26, length of jacket 20 cm.

Cone	19/26	24/29	
Dozen	**420/–**	**450/–**	a
Each	**38/–**	**41/–**	

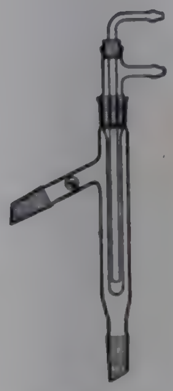
DT-120

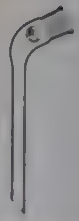
STILLHEADS suitable for use with above condensers. For details and prices see entries in List No. sequence.

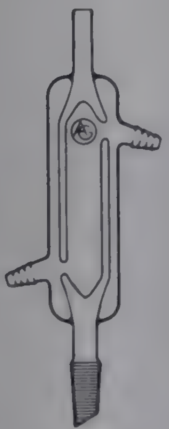
CU-580

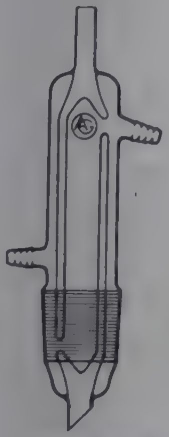
CONDENSER-STILLHEADS, Ⓐ **Davies double surface, borosilicate glass,** with thermometer socket 14/23.

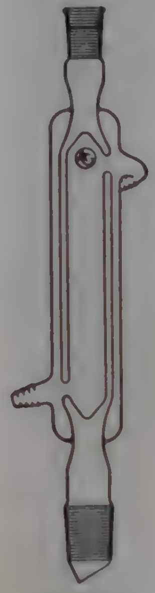
Length of jacket	15	20 cm	
Stillhead cone	19/26	24/29	
Receiver cone	19/26	19/26	
Dozen	**530/–**	**570/–**	a
Each	**48/–**	**52/–**	


CU-450


CU-460


CU-520


CU-530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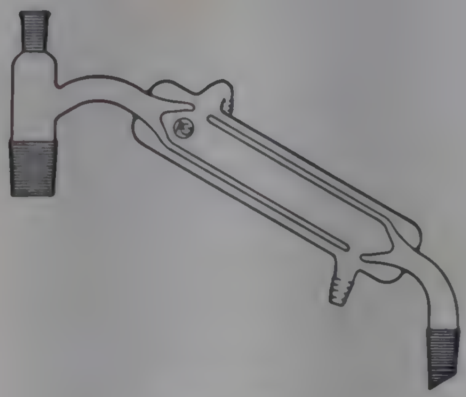

CU-580

CONDENSERS, *Quickfit*
see *Quickfit* APPARATUS

CONDENSERS, standard distillation
see PETROLEUM TESTING

CONDUCTIVITY BRIDGES
see ELECTROCHEMICAL ANALYSIS

CONE JOINTS see JOINTS

CONNECTORS, electrical
see ELECTRICAL APPARATUS
tubing
see TUBING CONNECTORS

CONWAY burette
see BURETTES
units
see MEDICAL SCIENCES

All items on this page normally available from stock.

***CV-010**

CORKS, best quality, tapered, cut with the grain. For general chemical use. Dimensions are approximate. Supplied in cartons of uniform size for convenient storage. Carton contents listed against each size are approximate. For small quantity requirements, the first six sizes are also offered in bags containing approx. one quarter the quantity of a carton.

Dozen cartons	**£5. 15. 0.**	c
Carton	**£0. 10. 6.**	
Bag	**£0. 4. 0.**	

Size No.	1	2	3	4	5	6
Small end	6	8	9	11	12	14 mm
Large end	9	11	12	14	15	17 mm
Length	16	18	23	23	27	27 mm
Carton qty.	36	30	24	24	18	15 doz.
Bag qty.	9	8	6	6	5	4 doz.

Size No.	7	8	9	10	11
Small end	15	17	18	20	21 mm
Large end	18	20	21	23	24 mm
Length	27	27	32	32	32 mm
Carton qty.	12	9	6	6	5 doz.

Size No.	12	13	14	15	16	17
Small end	23	24	26	28	30	32 mm
Large end	26	27	29	31	33	35 mm
Length	32	32	32	32	32	32 mm
Carton qty.	4	4	3	3	3	3 doz.

Size No.	18	19	20	21	22
Small end	35	38	41	44	47 mm
Large end	38	41	44	47	50 mm
Length	32	32	32	32	32 mm
Carton qty.	2	2	1	1	1 doz.

***CV-015**

CORKS, as above, in packs of one gross assorted.

Pack	A	B	
Size range	6—26 ¼—1	12—38 mm ½—1½ in	
1 doz. each size Nos.	1—10	5—13	
½ doz. each size Nos.	11—14	14—19	
Dozen packs	**165/–**	**295/–**	c
Pack	**15/–**	**27/–**	

***CV-030**

CORKS, flat form (Shives), fine quality white.

Size No.	10	11	12	13	14	15	
Small end	51	55	60	65	70	75 mm	
Thickness	15	15	15	15	20	20 mm	
Gross	**55/–**	**70/–**	**84/–**	**98/–**	**150/–**	**170/–**	c
Dozen	**5/10**	**7/–**	**8/–**	**9/–**	**13/6**	**15/6**	

Size No.	16	17	18	19	20	
Small end	80	85	90	95	100 mm	
Thickness	20	25	25	25	25 mm	
Gross	**190/–**	**270/–**	**310/–**	**340/–**	**360/–**	c
Dozen	**17/6**	**24/6**	**28/–**	**31/–**	**33/–**	

CV-050

CORK SHEETS, COMPRESSED, 30×15 cm.

Thickness	3	6	9	13 mm	
Dozen sheet	**7/6**	**13/3**	**22/–**	**27/6**	c
Sheet	**2/6**	**2/9**	**3/5**	**3/10**	

CV-070

CV-070

CORK RINGS, COMPRESSED, with mitred edge for supporting flasks, etc.

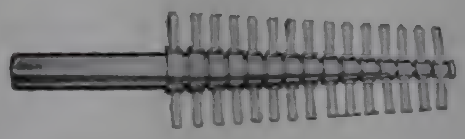
Size No.	1	2	3	4	5	
Dia.-external (approx.)	80	115	155	195	240 mm	
Dia.-internal (approx.)	45	80	115	155	195 mm	
Thickness	45	45	45	45	45 mm	
Dozen	**26/–**	**39/–**	**66/–**	**90/–**	**116/–**	c
Each	**3/8**	**4/8**	**6/8**	**8/6**	**10/6**	

CV-075

CORK RINGS, COMPRESSED, as above, but in sets of five ... ... Set **£1. 14. 0.** c

RUBBER CORKS see STOPPERS, RUBBER
ASBESTOS CORKS see ASBESTOS GOODS

CORK BORERS



CV-100

CV-100

CORK BORERS, safety pattern. The cutting tubes are hard soldered to the handles which are counter bored for additional safety. Each handle is numbered, No. 1 cutting a hole approximately 3 mm, each successive number being 1·5 mm larger up to No. 16 cutting a hole approximately 27 mm. Nickel plated brass in sets complete with ejector.

Set of	8	12	16 borers	
Size Nos.	1—8	1—12	1—16	
Range approximately	3—14	3—21	3—27 mm	
Set	**51/–**	**86/–**	**125/–**	c

REPLACEMENT PARTS

CV-101 **Borers,** as used in above sets, supplied singly.

Size Nos.	1, 2, 3, 4, 5	6, 7, 8, 9, 10	11, 12, 13, 14, 15, 16	
Each	**7/6**	**9/3**	**11/9**	c

CV-102 **Ejector,** for use with above borers. Each **£0. 2. 6.** c

All items on this page normally available from stock.

CORK BORERS AND CUTTERS

CV-105

CORK BORERS, economy pattern, plated brass. The collar on each borer has a transverse hole in which the ejector rod is used as a tommy bar. Set of 6 for cutting holes 4 to 12 mm dia. with ejector.
Dozen sets **£10.10. 0.** Set **£0.19. 0.** c

CV-110

CORK BORER SHARPENER, all metal construction for sharpening borers 3–27 mm dia.
Dozen **£6.10. 0.** Each **£0.11. 9.** c

CV-120

CORK BORING MACHINE, for drilling holes from 3 mm to 25 mm dia. in bark, compressed and rubber corks. Complete with set of 15 nickel plated steel borers ... ... Each **£13.15. 0.** c

REPLACEMENT PARTS

CV-121 **Borers, steel, for above machine. The size number is the approx. diam. in sixteenths of an inch (1·5 mm).**

No.	2, 3, 4, 5, 6	7, 8, 9, 10, 11	12, 13, 14, 15, 16	
Each	8/-	9/3	10/-	c

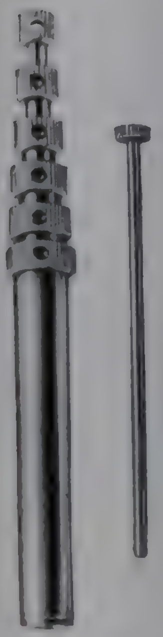
CV-122 **Borers, set of 15, one of each size ...** Set **£6.15. 0.** c

CV-130

CORK PRESS, for compression softening of corks up to 38 mm dia. ... ... Each **£1.18. 0.** c

CV-150

CORK CUTTING KNIFE, 10 cm blade in wooden handle ... ... Each **£0. 4. 0.** c


CV-105

CV-110

CV-120

CV-130

CV-150

COTTON WOOL,
coloured } see CULTURE APPARATUS
white }

COUNTERCURRENT
apparatus see EXTRACTION APPARATUS

COUNTERS,
revolution see TACHOMETERS

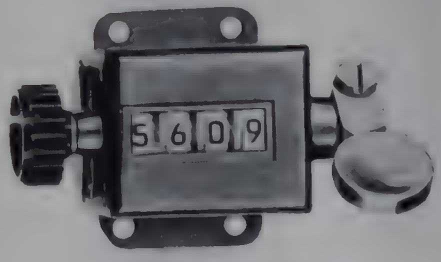
COUNTERS

CV-800

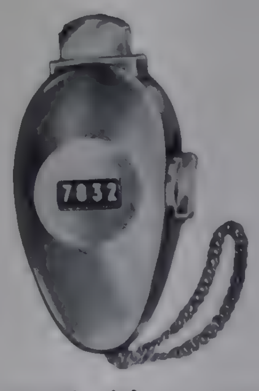
COUNTER, TALLY, registering to four figures. With thumb lever for manual operation. One complete turn of the reset knob returns all figures to zero.
Each **£1.17. 6.** c

CV-830

COUNTER, TALLY, registering to four figures with zero reset control. With push button for manual operation a chain retaining ring for location on the operator's finger, and a plastics stand for bench mounting.
Each **£2. 0. 0.** *m*

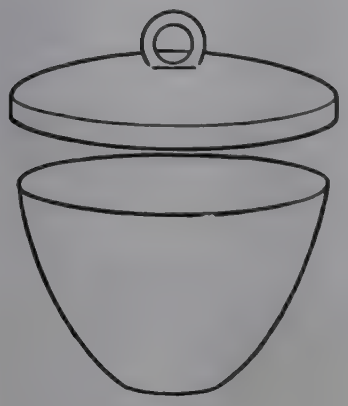


CV-800

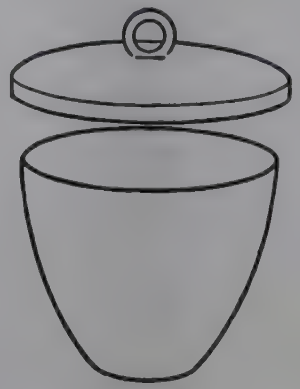


CV-830 without stand

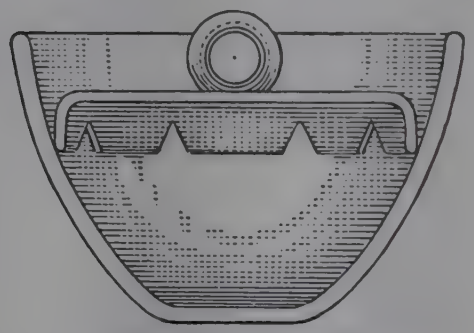
All items on this page normally available from stock.



Form A
CW-210 + CW-212
CW-250 + CW-252



Form B
CW-214 + CW-216



CW-250 + CW-254

CW-210
CRUCIBLES, *Royal Worcester* **porcelain,** squat form A, completely glazed.

CW-212
CRUCIBLE COVERS, for CW-210.

CW-214
CRUCIBLES, *Royal Worcester* **porcelain,** tall form B, completely glazed.

CW-216
CRUCIBLE COVERS, for CW-214.

Form A Size No.	Cap. ml	Dia. mm	CW-210			CW-212			
			Doz.	Six	Each	Doz.	Six	Each	
3/0	8	32	12/-	6/10	2/8	9/-	5/6	2/6	d
2/0	15	40	15/-	8/3	2/11	9/-	5/6	2/6	d
0	19	43	17/-	9/-	3/-	10/-	6/-	2/6	d
1	28	49	22/-	11/3	3/5	13/-	7/4	2/9	d
2	50	59	29/-	15/-	3/11	14/-	7/8	2/10	d
3	80	70	36/-	18/6	4/6	20/-	10/3	3/3	d
4	140	85	56/-	29/-	6/-	25/-	12/9	3/8	d
Form B Size No.			**CW-214**			**CW-216**			
3/0	6	28	10/-	6/-	2/6	8/-	5/-	2/6	d
2/0	11	32	12/-	6/10	2/8	8/-	5/-	2/6	d
0	16	39	16/-	8/6	2/11	10/-	6/-	2/6	d
1	32	43	27/-	13/9	3/9	10/-	6/-	2/6	d

CW-250
CRUCIBLES, *Vitreosil*, translucent, glazed, squat form.

CW-252
CRUCIBLE COVERS, standard pattern, for CW-250.

CW-254
CRUCIBLE COVERS, serrated drop-in pattern, for CW-250.

Cap. ml	Dia. mm	Height mm	CW-250		CW-252		CW-254		
			Ten	Each	Ten	Each	Ten	Each	
10	41	19	75/-	8/6	66/-	7/8	—	—	m
15	41	25	79/-	8/9	66/-	7/8	84/-	9/3	m
25	47	28	88/-	9/9	75/-	8/6	88/-	9/9	m
50	57	37	102/-	11/6	89/-	9/11	102/-	11/6	m
80	67	45	144/-	16/3	108/-	11/11	120/-	13/4	m
150	82	51	175/-	19/5	122/-	13/8	—	—	m

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for standard packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'dozen' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about 50/0d. per dozen.

This system is intended to encourage ordering in standard packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

All items on this page normally available from stock.

CW-280
CRUCIBLES, *Vitreosil*, translucent, glazed, tall shape.

CW-282
CRUCIBLE COVERS, for CW-280.

Capacity ml	Dia. mm	Height mm	CW-280		CW-282		
			Ten	Each	Ten	Each	
10	27	32	**118/–**	**13/1**	**59/–**	**7/–**	*m*
20	35	38	**130/–**	**14/3**	**59/–**	**7/–**	*m*
30	43	38·5	**132/–**	**14/7**	**62/–**	**7/4**	*m*
50	51·5	51	**161/–**	**17/10**	**66/–**	**7/8**	*m*
200	73	81	**233/–**	**25/11**	**112/–**	**12/5**	*m*

CW-300
CRUCIBLES, *Vitreosil*, translucent, glazed, with broad base.

Capacity	15	25	40 ml	
Dia.	41	48	57 mm	
Height	24	27	37 mm	
Lots of 10	**99/–**	**102/–**	**144/–**	*m*
Each	**11/1**	**11/6**	**15/9**	

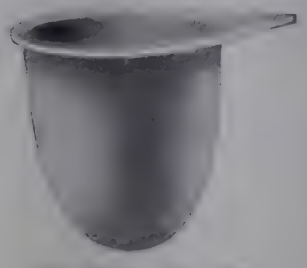
CW-310
CRUCIBLES, *Vitreosil*, translucent, glazed, for gold assay.

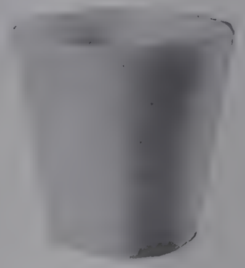
Capacity	10	30 ml	
Dia.	30	42 mm	
Height	30	42 mm	
Lots of 10	**118/–**	**158/–**	*m*
Each	**13/1**	**17/9**	

CW-330
CRUCIBLES, nickel, guaranteed 99% pure.

CW-332
CRUCIBLE COVERS, for CW-330.

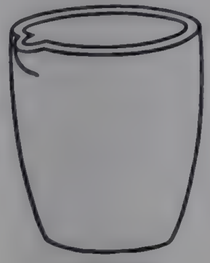
Capacity ml	Dia. mm	Height mm	CW-330		CW-332		
			Doz.	Each	Doz.	Each	
10	25	24	**27/–**	**3/9**	**14/6**	**2/10**	*m*
15	30	29	**29/6**	**4/–**	**15/–**	**2/11**	*m*
25	35	34	**36/–**	**4/6**	**16/6**	**3/–**	*m*
30	40	38	**40/–**	**4/9**	**18/6**	**3/2**	*m*
70	50	48	**54/–**	**5/10**	**20/6**	**3/3**	*m*
130	60	58	**74/–**	**7/4**	**31/–**	**4/1**	*m*


CW-280+CW-282


CW-310

CW-330+CW-332
CW-340

CW-360


CW-400

CW-340
CRUCIBLES, platinum, with covers. Quoted weights include cover.

Capacity	10	15	20	25	30 ml	
Dia.	26	29	34	35	38 mm	
Height	27	32	34	36	39 mm	
Approx. wt.	11	16	21	25	30 g	
Each	**485/–**	**685/–**	**847/6**	**1005/–**	**1180/–**	*fN*

Capacity	40	50	75	100 ml	
Dia.	42	47	53	56 mm	
Height	44	46	53	57 mm	
Approx. wt.	40	49	67	95 g	
Each	**1525/–**	**1870/–**	**2620/–**	**3580/–**	*fN*

CW-360
CRUCIBLES, sheet iron, with cover.

Capacity	45	200 ml	
Dia.	45	80 mm	
Height	35	60 mm	
Dozen	**42/–**	**64/–**	c
Each	**4/11**	**6/6**	

CW-385
CRUCIBLES, recrystallised alumina, squat form. Suitable for use up to 1900°C.

Capacity	10	15	25	40 ml	
Dia.	41	41	47	57 mm	
Height	19	25	28	37 mm	
Ten	**118/–**	**136/–**	**153/–**	**222/–**	*m*
Each	**13/2**	**15/2**	**17/1**	**22/6**	

CW-400
CRUCIBLES, Salamander plumbago, 'A' shape, with pouring lip.

Capacity	190	320	680 ml	
Top dia.	79	95	114 mm	
Base dia.	56	62	76 mm	
Height	97	109	141 mm	
Each	**5/6**	**8/–**	**16/6**	*m*

CRUCIBLE SUPPORTS

FS-694 to BS 1016
DK-550 GLASS TRIANGLES
TV-540 TRIANGLES
} For details see entries in List No. sequence.

Items on this page normally available from stock except those coded *N*.

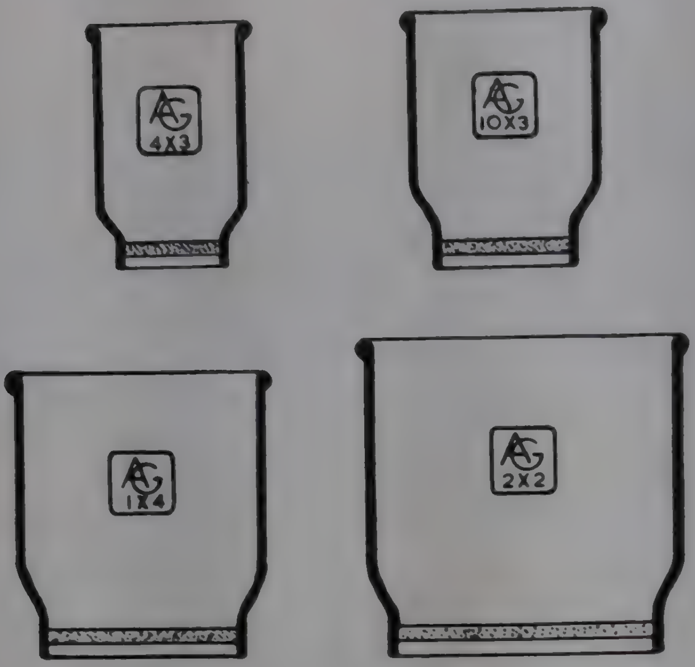
AG
Regd.

FRITTED GLASS FILTER CRUCIBLES

All AG fritted (sintered) glass filter crucibles are manufactured in our own factory under accurately controlled conditions. Robust construction from stout wall borosilicate glass tubing with a reinforcing rim at the top ensures maximum life. The fritted filter plates are well fired to avoid friability and to maintain porosity within guaranteed limits.

For full details of porosity ranges and other useful information see data page on FRITTED FILTRATION APPARATUS.

When ordering always state reference number and porosity required. The final figure of the Ref. No. represents the porosity.

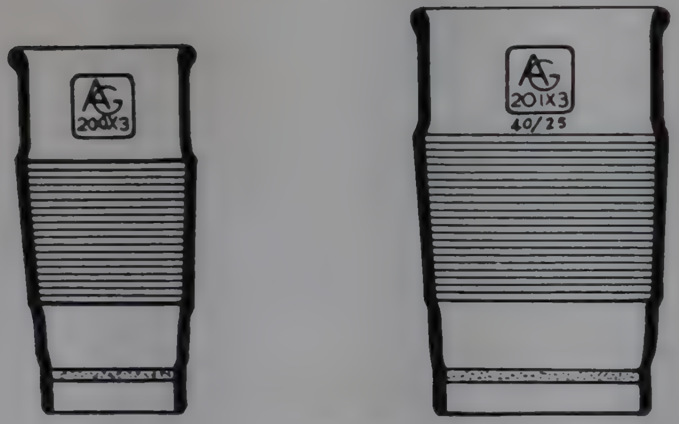


CW-480
Approx. 2/3 full size

CW-480

CRUCIBLES, AG FRITTED FILTER, borosilicate glass. A stable crucible with a short skirt below the filter plate. These new pattern crucibles form an excellent fit with funnels CW-720 and rings CW-725.

Plate dia.	15	20	30	40 mm	
Capacity, approx.	8	15	35	70 ml	
Height	35	40	45	50 mm	
Wt. approx.	8	15	25	35 g	
Ref. Nos.	4X1 4X2 4X3 4X4	10X1 10X2 10X3 10X4	1X1 1X2 1X3 1X4	2X1 2X2 2X3 2X4	
Dozen	**59/-**	**62/-**	**63/-**	**76/-**	a
Each	**6/2**	**6/4**	**6/10**	**7/6**	
Ref. Nos.	4X5	10X5	1X5	2X5	
Dozen	**170/-**	**200/-**	**215/-**	**255/-**	a
Each	**15/6**	**18/-**	**19/6**	**23/6**	



CW-520
Approx. 2/3 full size

CW-520

CRUCIBLES, AG FRITTED FILTER, borosilicate glass, with standard cone joint. Quick and clean to use. Rubber adapters not required.

Ref. Nos.	200X1 200X2 200X3 200X4	200X5	201X1 201X2 201X3 201X4	201X5	
Plate dia.	20	20	30	30 mm	
Capacity approx.	20	20	50	50 ml	
Height, approx.	55	55	65	65 mm	
Wt. approx.	25	25	35	35 g	
Cone	29/22	29/22	40/25	40/25	
Dozen	**180/-**	**295/-**	**205/-**	**340/-**	a
Each	**16/6**	**27/-**	**18/6**	**31/-**	

DRYING AND IGNITION

Fritted crucibles are specially suitable for precipitates which have to be dried to constant weight at 110°C. They can be used with boiling liquids, placed directly in a drying oven up to 150°C, and then left to cool in a desiccator or in the open air. When ignition is required an electric furnace is necessary. The crucibles should be placed in the cold furnace, slowly heated to a temperature not exceeding 580°C and allowed to cool down again to at least 200°C before removal from the furnace. In the case of filters with porosity 5 plates, greater care is needed when heating, especially when the filter plate is wet. These filters should always be placed in a cold oven and heated gradually, since the sudden evolution of steam from the fine pores may set up sufficient pressure within the filter to disrupt it.

All items on this page normally available from stock.

FILTER CRUCIBLE FITTING CHART

The following chart indicates the appropriate funnel and rubber adapter sizes required for particular crucibles when used in the various assemblies illustrated below.

Crucible		Assembly Fig. I		Assembly Fig. 2		Assembly Fig. 3	
List No. and type	Capacity ml	Funnel CW-720 with Size No.	Adapter CW-725 Size No.	Funnel CW-720 with Size No.	Adapter CW-745 Size No.	Funnel CW-720 with Size No.	Adapter CW-750 Size No.
CW-480 Fritted glass	8	C	1	B	2	—	—
	15	C	3	C	3	—	—
	35	D	6	D	4	—	—
	70	E	7	—	—	—	—
CW-550 Worcester	10	C	2	B	2*	B	2
	25	D	5	C	3*	C	3
	35	E	5	D	4	D	4
CW-570 Vitreosil	15	C	3	B	2*	—	—
	25	D	4	C	3*	—	—
	35	D	5	D	4	—	—
CW-640/1/2 Porous alumina	20	C	3	C	3*	C	3
	30	D	5	D	4	D	4
CW-650 Worcester porous	9	C	2	B	2*	B	2
	16	C	3	C	3	B	2
	25	D	4	C	3*	C	3
	35	D	5	D	4	D	4
CW-681/2/3/4 Vitreosil porous	30	D	4	C	3	C	3
	50	D	6	C	3	D	4

*In these instances the lower end of the rubber adapter will project below the base of the crucible and may be cut off if desired to avoid contact with the filtrate.

SPECIMEN ASSEMBLIES FOR FILTER CRUCIBLES

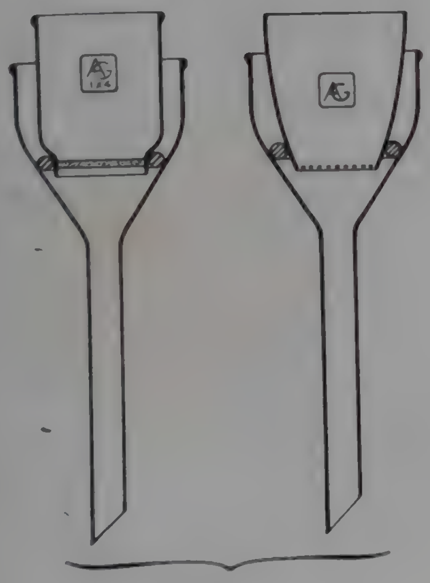


Fig. I
Rubber ring
CW-725
with funnel
CW-720

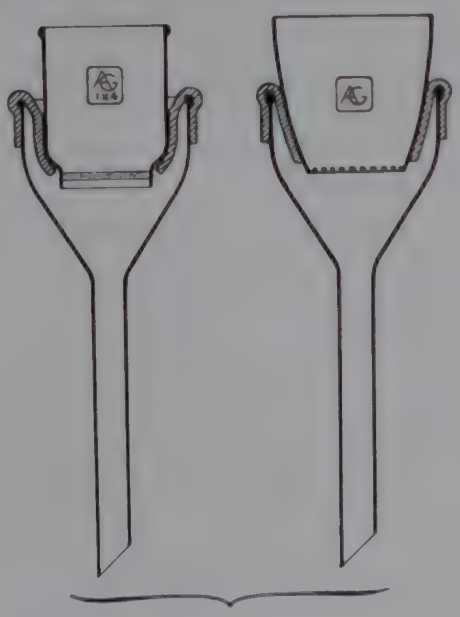


Fig. 2
Rubber cone
CW-745
with funnel
CW-720

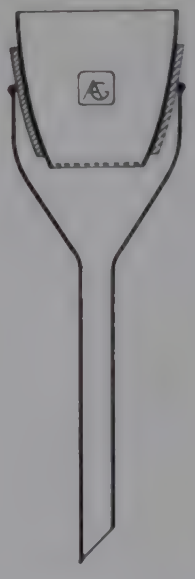


Fig. 3
Rubber cone
CW-750
with funnel
CW-720

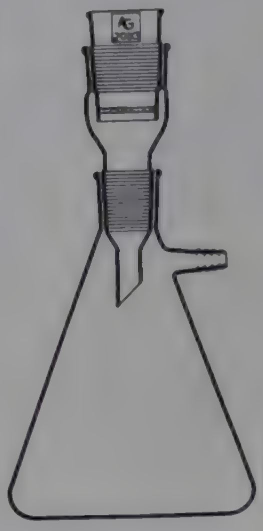


Fig. 4
Joint adapter
CW-750
with flask
FJ-290 or
Q-FB 500/3

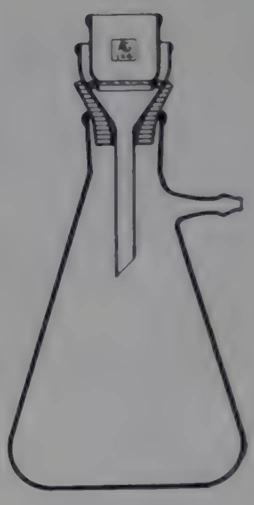
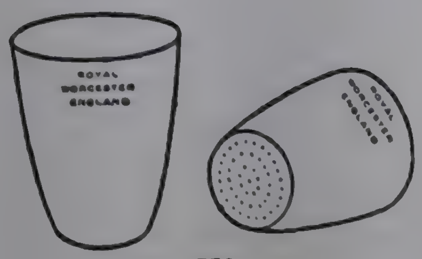


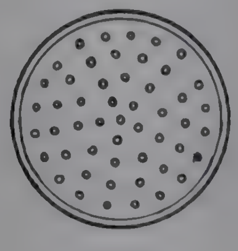
Fig. 5
Rubber ring
CW-725
with funnel
CW-720
and adapter
CW-722

continued overleaf

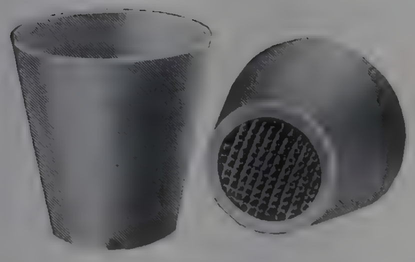
GOOCH FILTER CRUCIBLES



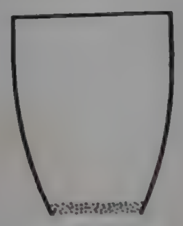
CW-550



CW-552



CW-570



CW-650

PERFORATED BASE

CW-550

CRUCIBLES, FILTER, Gooch, *Royal Worcester* **porcelain,** with perforated base.

Capacity	10	25	35 ml	
Top dia.	29	36	42 mm	
Height	31	40	45 mm	
Dozen	**36/–**	**45/–**	**51/–**	*d*
Six	**18/6**	**23/–**	**26/–**	
Each	**4/6**	**5/2**	**5/8**	

CW-552 **Filter disks,** for CW-550.

Dia.	15	20	23 mm	
Dozen	**17/–**	**20/–**	**20/–**	*d*
Six	**9/–**	**10/3**	**10/3**	
Each	**3/–**	**3/3**	**3/3**	

CW-570

CRUCIBLES, FILTER, Gooch, *Vitreosil* **silica,** translucent with perforated base.

Capacity	15	25	35 ml	
Top dia.	34	40	45 mm	
Base dia.	23	25	27 mm	
Height	34	40	45 mm	
Ten	**420/–**	**439/–**	**484/–**	*m*
Each	**46/6**	**48/8**	**53/10**	

For suitable Gooch asbestos see AR-460 in List No. sequence.

POROUS FILTER BASE

CRUCIBLÉS, FILTER, Gooch, porous alumina, with curved sides. In three porosities.

CW-640 Coarse porosity. (20–30 μm).
CW-641 Medium porosity. (10–15 μm).
CW-642 Fine porosity. (<5 μm).

Capacity	20	30 ml	
Top dia.	35	41 mm	
Base dia.	21	24 mm	
Height	38	43 mm	
Ten	**57/–**	**70/–**	*m*
Each	**6/10**	**8/–**	

When ordering please state porosity required.

CW-650

CRUCIBLES, FILTER, *Royal Worcester* **porcelain,** for filtration of fine precipitates and subsequent ignition. With porous base to BS 1752, porosity 4.

Capacity	9	16	25	35 ml	
Top dia.	25	30	35	40 mm	
Height	28	35	40	43 mm	
Each	**5/6**	**6/–**	**7/3**	**8/–**	*d*

VITREOSIL FILTER AND IGNITION CRUCIBLES

For filtration and subsequent ignition at temperatures up to 1000°C. Available in four porosity grades covering filtration from coarse precipitates to analytical work with very fine precipitates.

Porosities 1 to 4 in accordance with the pore sizes specified in BS 1752.

When ordering please state porosity number required.

CRUCIBLES, FILTER and IGNITION, *Vitreosil* **silica,** tall (platinum) shape with porous base.

	Capacity		30	50 ml	
	Top dia.		38	47 mm	
	Disk dia.		23	30 mm	
	Height		44	51 mm	
CW-681	Porosity No. 1	Each	**48/8**	**66/9**	*m*
CW-682	Porosity No. 2	Each	**51/7**	**73/11**	*m*
CW-683	Porosity No. 3				
CW-684	Porosity No. 4	Each	**53/10**	**76/–**	*m*

SPECIMEN ASSEMBLIES of filter crucibles with adapters and funnels see page 175

All items on this page normally available from stock.

GOOCH FUNNELS AND RUBBER ADAPTERS

CW-720

FUNNELS, Ⓐ **borosilicate glass,** for use with filter crucibles as shown in table on page 175.

Size No.	A	B	C	D	E	
Int. dia.	23	29	33	43	53 mm	
Dozen	**39/-**	**42/-**	**51/-**	**57/-**	**82/-**	a
Each	**4/8**	**4/11**	**5/8**	**6/-**	**7/10**	

CW-722

FLASK ADAPTER, rubber, *Gallenkamp.* A pliable, moulded rubber sleeve which fits on the conical part of the Gooch crucible adapters and small Buchner funnels. The sleeve then makes a vacuum-tight joint with the rim of a filter flask so avoiding the use of a bored stopper. Convenient and economical—will not adhere to the funnel or flask—can be used again and again.

Suitable for use with:

List No.	Description	Sizes
CW-720	Gooch funnels	All
FP-400	Fritted glass funnels	3X, 11X, 11aX
FP-402	Fritted glass funnels	17X, 25X
FP-460	Slit sieve funnel	
FP-495	Porcelain funnels	65 and 82 mm dia.
FP-510	Porcelain funnels	2, 3, 4 and 5

Dozen **£0. 18. 0.** Each **£0. 3. 1.** c

CW-725

RUBBER RING ADAPTERS, precision moulded, nitrile synthetic rubber, for use with filter crucibles in funnels CW-720 as shown in table on page 175.

Size No.	1	2	3	4	5	6	7	
Int. dia.	17	21	23	25	29	33	43 mm	
Gross	**86/-**	**86/-**	**110/-**	**110/-**	**130/-**	**130/-**	**145/-**	c
Dozen	**8/3**	**8/3**	**10/-**	**10/-**	**11/9**	**11/9**	**13/3**	

CW-745

RUBBER CONES, for use with filter crucibles.

Size No.	1	2	3	4	
Int. dia., large end	22	30	40	50 mm	
Int. dia., small end	16	20	25	30 mm	
Length	40	40	45	50 mm	
Dozen	**22/-**	**27/-**	**30/-**	**42/-**	c
Each	**3/5**	**3/9**	**4/-**	**4/11**	

CW-750

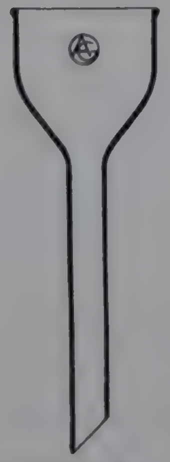
RUBBER CONES, moulded to shape of crucible, for use with filter crucibles.

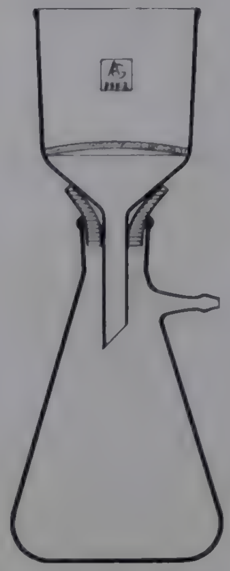
Size No.	1	2	3	4	
Int. dia., large end	20	27	34	40 mm	
Int. dia., small end	14	19	24	26 mm	
Length	23	25	31	35 mm	
Gross	**160/-**	**175/-**	**200/-**	**230/-**	c
Dozen	**14/6**	**16/-**	**18/-**	**21/-**	

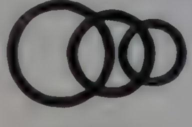
CW-760

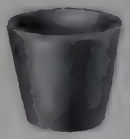
CRUCIBLE ADAPTERS, Ⓐ standard joint, **borosilicate glass,** for use with fritted glass crucibles CW-520.

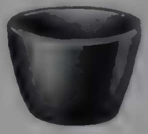
Socket	29/22	40/25	40/25	
Cone	24/29	24/29	29/32	
Dozen	**125/-**	**150/-**	**175/-**	a
Each	**11/3**	**13/6**	**16/-**	

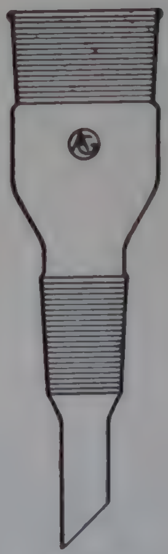

CW-720

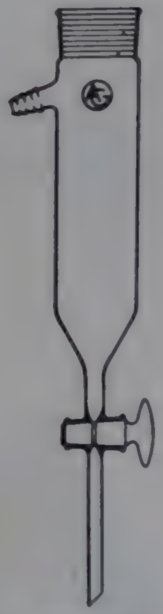

CW-722 in use with FP-402


CW-725


CW-745


CW-750


CW-760


CW-770

CW-770

RECEIVER TUBES, Ⓐ standard joint, **borosilicate glass,** with stopcock, for use with fritted glass crucibles CW-520.

Socket	29/22	40/25	
Dozen	**230/-**	**275/-**	a
Each	**21/-**	**25/-**	

CRYOSCOPES see **DC-800** and **MW-020** in List No. sequence.

All items on this page normally available from stock.

CULTURE APPARATUS

CX-200

BOTTLES, SCREW-CAP, McCartney, with narrow neck and aluminium cap fitted with rubber liner.

Capacity	7	14 ml	
Gross	**70/–**	**74/–**	c
Dozen	**7/–**	**7/4**	

REPLACEMENT PARTS

CX-202 **Caps,** fitted with rubber liner, for CX-200.
Gross **£0. 18. 6.** Dozen **£0. 3. 2.** c

CX-204 **Rubber liners,** for CX-200.
Gross **£0. 12. 3.** Dozen **£0. 2. 8.** c

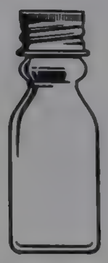
CX-210

BOTTLE, SCREW-CAP, McCartney, with medium neck and aluminium cap fitted with rubber liner, 28 ml Capacity ... Gross **£4. 2. 0.** Dozen **£0. 7. 10.** c

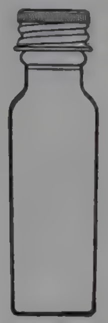
REPLACEMENT PARTS

CX-212 **Caps,** fitted with rubber liner, for CX-210.
Gross **£1. 2. 6.** Dozen **£0. 3. 5.** c

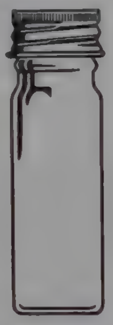
CX-214 **Rubber liners,** for CX-210 and CX-215.
Gross **£0. 15. 0.** Dozen **£0. 2. 11.** c



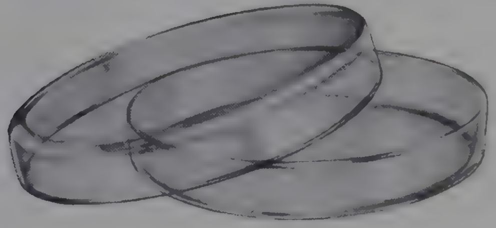
CX-200



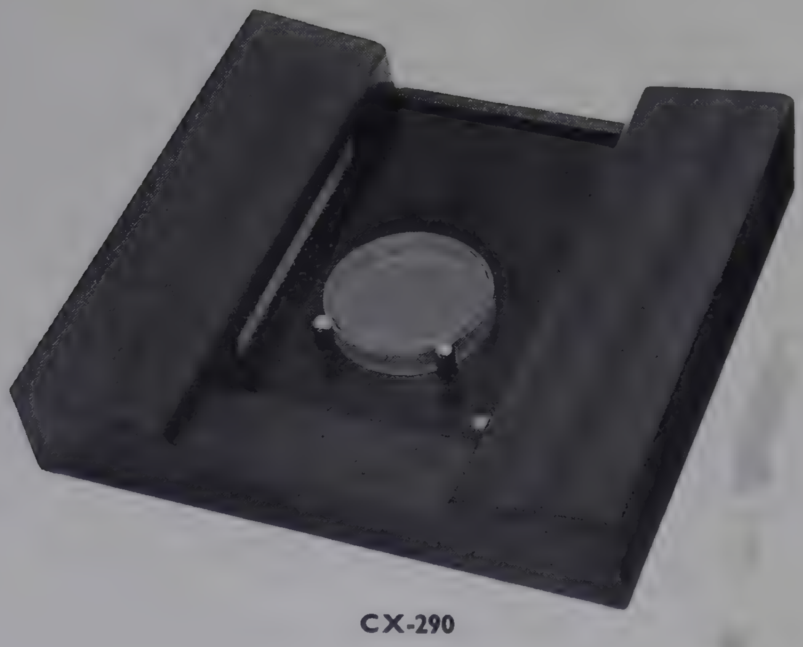
CX-210



CX-220



CX-240
CX-242
CX-244
CX-250
CX-270



CX-290

CX-215

BOTTLE, as CX-210 but with 4 mm hole in centre of metal cap to permit withdrawal of contents by a hypodermic needle puncturing the rubber liner.
Gross **£4. 10. 0.** Dozen **£0. 8. 6.** c

REPLACEMENT PARTS

CX-216 **Caps** with centre hole, fitted with rubber liner.
Gross **£1. 8. 0.** Dozen **£0. 3. 10.** c

CX-214 **Rubber liners,** see entry at left.

CX-220

BOTTLE, SCREW-CAP, universal container, with wide neck, parallel sides and aluminium cap fitted with rubber liner, 28 ml capacity.
Gross **£4. 6. 0.** Dozen **£0. 8. 3.** c

REPLACEMENT PARTS

CX-222 **Caps,** fitted with rubber liner, for CX-220.
Gross **£1. 8. 0.** Dozen **£0. 3. 10.** c

CX-224 **Rubber liners,** for CX-220.
Gross **£1. 0. 0.** Dozen **£0. 3. 3.** c

ACCESSORY

SR-772 **Sterilising rack** for 28 ml McCartney and universal bottles, see entry in List No. sequence.

CX-240

DISH, PETRI, clear polystyrene, expendable. These sterile, biologically inert dishes have an excellent uniform finish which is free from mould marks. They may be used for any standard culturing techniques and then discarded, so dispensing with the usual washing, autoclaving and storage procedures and eliminating the high running costs of replacing broken glass Petri dishes. The lids are slightly recessed for safe stacking.

Diameter	50	90 mm	
Depth including lid	18	15 mm	
Carton of 1000	**£18. 0. 0.**	—	m
Carton of 500	—	**£6. 10. 0.**	
Pack of 100	**£2. 5. 0.**	**£1. 16. 0.**	

CX-242

DISH, PETRI, sterile and expendable, made from **water wettable, non-toxic** clear polystyrene, 50 mm dia. Both components being precision moulded, the lid rests closely on the dish giving an almost air-tight closure.
Carton of 480 **£12. 15. 0.** m

CX-244

DISH, PETRI, as CX-242 but with spacers moulded on underside of lid, for use where tight closure is not required ... ... Carton of 480 **£12. 15. 0.** m

CX-250

DISH, PETRI, resistant flint glass, 10 cm dia., conforming in all respects to BS 611. Standard pack quantity 72.

20 packs	**£137. 10. 0.**	m
5 packs	**£36. 0. 0.**	
1 pack	**£7. 12. 0.**	
Dozen	**£1. 7. 0.**	

Quotation for larger quantities on application.

ACCESSORY

SR-820 **Sterilising boxes** for 10 cm Petri dishes, see entry in List No. sequence.

CX-270

DISHES, PETRI, *Pyrex brand* glass, height 18 mm.

Size	51	63	70	95	115	140 mm	
Cover dia.	57	70	76	101	122	149 mm	
Std. pack qty.	72	72	72	72	24	24	
Std. pack	**318/–**	**351/–**	**383/–**	**459/–**	**174/–**	**225/–**	d
Dozen	**57/–**	**62/–**	**68/–**	**82/–**	**90/–**	**114/–**	
Each	**6/–**	**6/6**	**6/10**	**7/10**	**8/6**	**10/6**	

CX-290

COLONY ILLUMINATOR, for counting bacterial colonies on Petri dishes up to 15 cm dia. Comprises black plastics baseplate and two 30W strip lamps. Complete in case with on/off switch and lead. For 220/240V a.c. supplies only ... ... Each **£14. 15. 0.** m

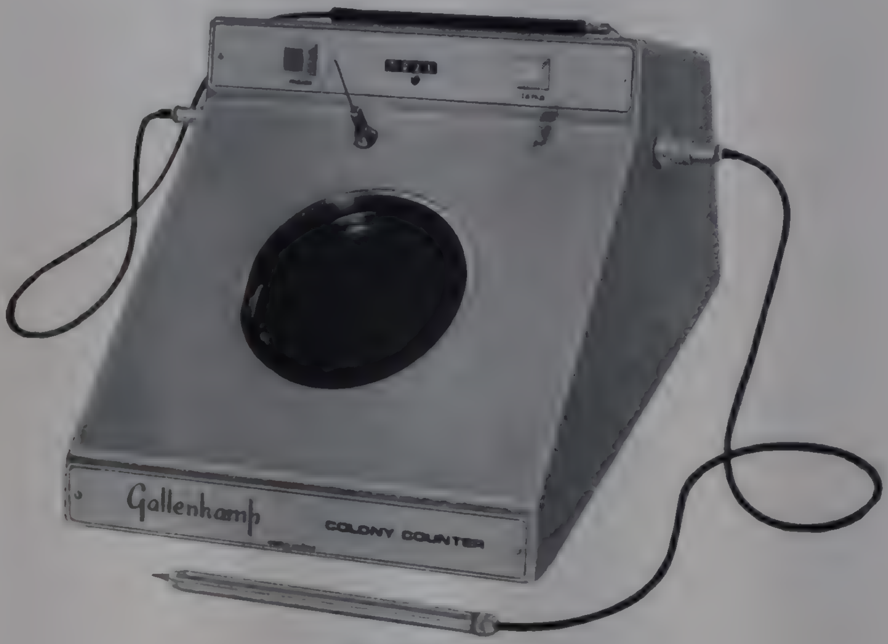
All items on this page normally available from stock.

Gallenkamp COLONY COUNTER

WITH TRANSISTORISED DIGITAL COUNTING CIRCUIT

For counting bacterial and mould colonies in biology, botany, zoology, bacteriology, pathology and public health investigations.

- **Digital display of colony count**
- **Bright, dazzle-free peripheral illumination over light or dark grounds**
- **Contact and marker probes supplied; hand held push switch available**
- **Easily cleaned outer case with replaceable dish holder**
- **Dish holder diameter 12·4 cm—accepts all usual dishes including those to BS 611**
- **Adjustable full-field magnifier accessory easily mounted on case**
- **Contact needles easily removed for sterilising**



CX-300

OPERATION

The MAINS switch controls the supply of power to the whole instrument and the LAMP switch controls the built-in circular fluorescent lamp. Both switches are push type which light up when ON.

For contact counting, the flip-over stationary electrode and the manual needle probe are used. These two contacts complete a circuit through the medium, causing the counter to operate. The electrical resistance of the medium can be up to 10 KΩ which permits most common media to be used. Both the electrode and probe needles are easily detachable for sterilising.

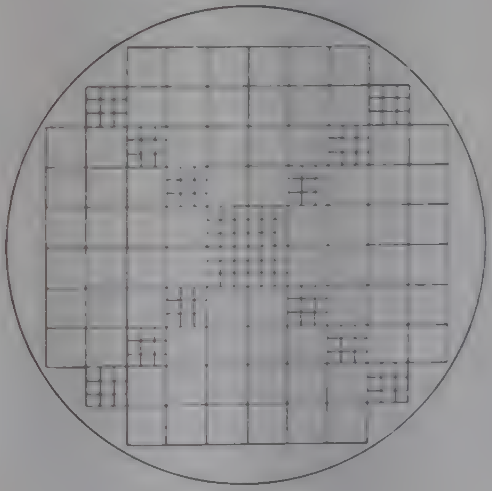
For counting through the lid or base of the dish, the marker probe alone is used. This contains a replaceable fibre-nib cartridge (available in several colours for sequence counting and coding) and a sensitive microswitch to complete the counter circuit. Using normal writing pressure, the counter operates each time a mark is made on the dish.

CX-300

COLONY COUNTER, *Gallenkamp*, as specification with built-in light or dark ground peripheral illumination, transistorised digital counting circuit, needle probe, and black marker probe.

For 220/240V 50 Hz supplies ...	Each	**£65. 0. 0.**	*b*
For 200/210V 50 Hz supplies ...	Each	**£65. 0. 0.**	*bN*
For 100/120V 50 or 60 Hz supplies.	Each	**£65. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.



CX-314

REPLACEMENT PARTS

CX-306	**Dish holder,** moulded clear acrylic.	Pack of 5	**£2. 13. 0.**	*b*
CX-307	**Spare fibre-nib cartridges,** pack containing 3 black, 3 red, 3 blue and 3 green cartridges.	Pack	**£1. 12. 6.**	*b*
CX-308	**Circular fluorescent lamp** (all voltages).	Each	**£1. 7. 0.**	*m*
CX-309	**Needles,** pack containing 10 probe needles and 10 needles for hinged contact	Pack	**£0. 18. 0.**	*b*

ACCESSORIES

CX-314	**Graticule,** Wolffhuegel pattern, clear acrylic, 12 cm diameter with black filled 1 cm² grid. To fit dish holder.	Each	**£2. 10. 0.**	*b*
CX-316	**Push button hand switch** for counting operations not requiring probes. With lead and plug.	Each	**£2. 2. 6.**	*b*
CX-318	**Magnifying lens** ×2. Dia. 13 cm with adjustable arm for mounting on the colony counter case.	Each	**£8. 0. 0.**	*b*

Bibliography

'An electric colony counter', W. D. Linsell, M.D. Lond., F.C.Path., *Journal of Clinical Pathology*. 1953. p. 91, vol. 6.

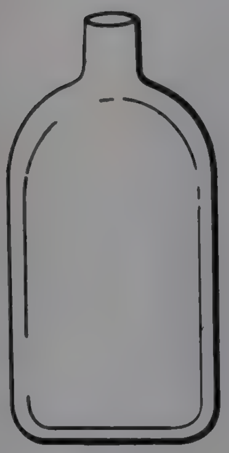
Items on this page normally available from stock except those coded *N*.

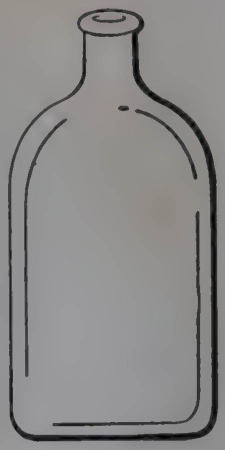
CX-325

FLASK, Roux, *Pyrex brand* glass, 1000 ml, with central neck. Std. pack of 12 **£6. 5. 0.** Each **£0.11. 3.** *d*

CX-330

FLASK, Roux, *Pyrex brand* glass with offset ring neck, 1000 ml. Std. pack of 12 **£8.12. 0.** Each **£0.15. 6.** *d*


CX-325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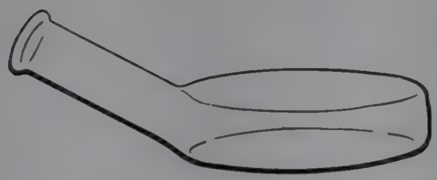
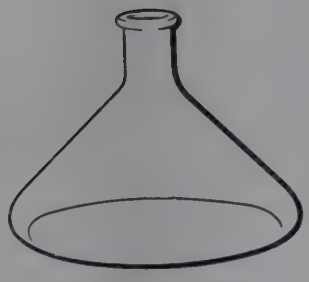
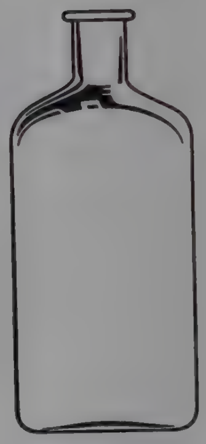

CX-340


CX-350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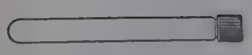
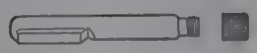

CX-460
CX-465


CX-472

AUTOCLAVES see AX-100 et seq.
INCUBATORS see IH-100 et seq.
STERILIZING OVENS see OV-010 et seq.
For prices see entries in List No. sequence.

AL-100 Aluminium foil
PP-520 Parafilm
PP-525 Sealing tape, ptfe
Suitable for closure of culture tubes and flasks, see entries in List No. sequence.

CX-340

FLASKS, Carrel, *Pyrex brand* glass.

Dia.	30	50	80 mm	
Height	10	11	25 mm	
Std. pack of 6	**50/–**	**68/–**	**173/–**	*d*
Each	**9/–**	**12/–**	**31/–**	

CX-350

FLASK, conical, *Pyrex brand* glass, 1000 ml. Std. pack of 12 **£5.10. 0.** Each **£0.10. 0.** *d*

CX-370

FLASK, Thompson, a large volume Roux type culture flask with an offset neck for laboratory and pilot scale culture work. Capacity 2·5 litres, overall dimensions 34×16×8 cm. Borosilicate glass. Dozen **£14. 0. 0.** Each **£1. 5. 6.** *m*

CX-400

TUBES, culture, borosilicate glass with plain rimless neck selected to be closed by *Oxoid* caps CX-450. Size 150×16 mm. Gross **£3.12. 0.** Dozen **£0. 7. 2.** *d*

CX-450

CAPS, *Oxoid*, aluminium for closing necks of culture tubes. Nominal size ⅝ in. Internal dia. 16·2 mm. Natural finish. Gross **£2.12. 0.** Dozen **£0. 5. 8.** *m*

CX-460

TUBES, tissue culture, neutral glass, 16 mm diameter, with plastics screw cap and rubber liner packed separately. Tubes and caps can be autoclaved at 121°C.

Length overall	130	150 mm	
Carton of 110	**£4.16. 0.**	**£5. 2. 0.**	*c*

REPLACEMENT PART
CX-462 **Cap,** with rubber liner. Dozen packs **£7. 5. 0.** Pack of 50 **£0.13. 3.** *c*

CX-465

TUBES, tissue culture, sterile and expendable, made from **water wettable, non-toxic** clear polystyrene, 115×14 mm dia. Fitted with airtight screw cap. Pack of 200 **£8.10. 0.** *m*

CX-470

TUBES, tissue culture, Leighton. A neutral glass test tube approximately 125 mm length×16 mm diameter without rim, with flat rectangular enlargement approximately 40×12 mm in wall at closed end. Indentation retains medium in use. The tube permits simultaneous preparation of a matrix culture and a 'flying coverslip' culture in the same tube. The matrix culture can, moreover, be examined without optical distortion by the wall, of the tube. Ref. J. Leighton (1954) 'The Growth Patterns of some Transplantable Animal Tumours in Sponge Matrix Tissue Culture', J. Nat. Cancer Inst. **15,** 273. Box of 48 **£7.10. 0.** *c*

CX-472

TUBES, tissue culture, Leighton, as CX-470, but with plastics screw cap with rubber liner packed separately. Tube and cap can be autoclaved at 121°C. Box of 48 **£10. 0. 0.** *c*

REPLACEMENT PART
CX-462 **Cap,** with rubber liner. For price see entry in List No. sequence.

CX-474

COVER SLIPS, rectangular shape 35×9·5 mm, No. 1½, 0·16—0·19 mm thick, suitable for use with tubes CX-470 and CX-472. Per 1000 **£3.15. 0.** Per 100 **£0. 8. 6.** *m*

All items on this page normally available from stock.

CX-480

TUBE RACK, tissue culture. Anodised aluminium rack to hold 48 Leighton tubes horizontally in 4 layers. A self-locking feature ensures correct tube location and allows rack to be tilted for emptying tubes simultaneously. Supplied packed flat, the rack is quickly assembled using a screwdriver ... ... Each **£8.15. 0.** c

CX-480 with CX-472

CX-485

COTTON WOOL, non-absorbent, available in following colours:

- Light blue
- Dark blue
- Light green
- Dark green
- Mauve
- Red
- Rose pink
- Canary yellow

When ordering please specify colour. Per lb **£0.11. 3.** c

CX-486

COTTON WOOL, non-absorbent, white.

In quantities of	56	14	1 lb	
Per lb	**8/9**	**9/–**	**9/9**	c

CX-487

COTTON WOOL, absorbent, white.

In quantities of	56	14	1 lb	
Per lb	**5/6**	**5/9**	**6/–**	c

CX-500

CULTURE JAR, ANAEROBIC, *Gallenkamp*, **modified McIntosh & Fildes pattern,** for the safe growth of anaerobes by utilising a catalyst which is active above 0°C. The heavy glass jar 23 cm high × 15 cm dia. has its top surface ground flat, and the metal cover fitted with a toroidal sealing ring is held in place by a strong bridge clamp by hand tightening only. The cover is fitted with two needle valves for evacuation and filling and a sachet containing the catalyst. Complete with instructions. Each **£12.10. 0.** b

Gallenkamp

CX-500

REPLACEMENT PARTS

CX-502 **Glass jar** only, for above ... ... Each **£1. 7. 6.** c
CX-504 **Sealing ring** ... ... Each **£0. 9. 0.** b
CX-522 **Catalyst,** see entry below.

CX-520

CULTURE JAR, ANAEROBIC, modified McIntosh & Fildes pattern, all metal construction, consisting of a spun jar with a top flange recessed for a toroidal rubber sealing ring and a cover held in place by a strong bridge clamp. The cover is fitted with two needle valves for evacuation and filling, and a sachet containing a room temperature catalyst. A sidearm on the jar is connected to a glass tube containing semi-solid Lucas indicator. The inner surfaces are plated to resist corrosion and the outside is stove enamelled ... ... Each **£16. 0. 0.** f

CX-520

REPLACEMENT PARTS

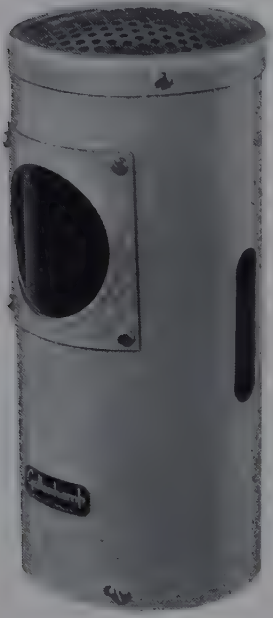
CX-522 **Catalyst,** in monel sachet, for CX-500 and CX-520.
Dozen packs **£14.11. 0.** Pack of 3 **£1. 6. 6.** f

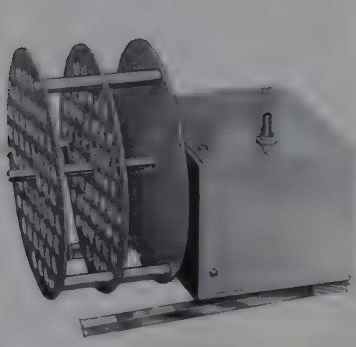
CX-524 **Lucas indicator,** in glass tube.
Dozen **£4.18. 0.** Each **£0. 9. 0.** f

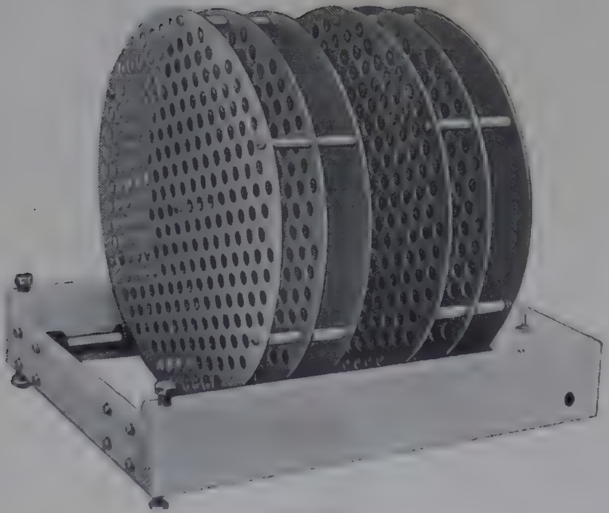
CX-526 **Sealing ring.**
Dozen **£2. 6. 0.** Each **£0. 4. 3.** f

All items on this page normally available from stock.

CX-560


CX-600


CX-804


CX-806

CX-560
NEEDLE AND WIRE HOLDER, with brass chuck and light aluminium handle, 20 cm long, also suitable for holding platinum wire for blowpipe analysis. Will accept wire up to 0·635 mm dia. ... ... Each **£0. 4. 0.** c

CX-570
PLATINUM-IRIDIUM WIRE, 10% platinum alloy, 0·5 mm dia. ... ... Foot **£2.16. 0.** *m*

CX-580
NICKEL CHROMIUM WIRE, 0·5 mm dia.
Dozen yds **£0. 4. 0.** c

CX-600
BACTERIAL INCINERATOR, *Gallenkamp*, for flaming platinum loops without scattering infective materials. Comprises a batswing burner in a heat-resistant finished sheet steel hood. A mica window and a slit to admit the loop are positioned for maximum efficiency. A removable perforated copper disk is fitted. The incinerator is very stable due to the heavy metal base incorporated. Diameter 8 cm, height 18 cm ... ... Each **£4. 8. 0.** *b*

REPLACEMENT PART
CX-602 Perforated copper disk ... ... Each **£0. 4. 6.** *b*

CX-804
ROLLER TUBE CULTURE APPARATUS, small model, for virus tissue culture and similar applications. The anodised dural drum accommodates 54 test tubes 12·5 mm dia. and is rotated by an a.c. motor at 12 rev per hour. Power consumption is less than 2W. Adjustable tilt ensures that the medium is sloped away from the open ends of the tubes.
Overall dimensions with drum 22·5 × 18 × 18 cm high
Net weight 2 kg
For 200/250V 50 Hz supplies ... Each **£18. 0. 0.** *f*
For 100/120V 50 or 60 Hz supplies. Each **£18. 0. 0.** *fN*

When ordering please state voltage and nature of supply.

CX-806
ROLLER TUBE CULTURE APPARATUS, large model, for virus tissue culture and similar applications. Similar to CX-804 but fitted with twin larger diameter drums mounted on rollers to accept 480 test tubes 12·5 mm dia. and rotated at 8 rev/hour. Power consumption is only 15W and **the apparatus may be used in incubator IH-100 size No. 3** at temperatures not less than 10°C above ambient. The apparatus can be tilted to the desired angle by means of adjusting screws. Overall dimensions with drum 46 × 38 × 38 cm high.
Net weight 9 kg
For 200/250V 50 Hz supplies ... Each **£62. 0. 0.** *fN*
For 100/120V 50 or 60 Hz supplies. Each **£62. 0. 0.** *fN*

When ordering please state voltage and nature of supply.

For suitable test tubes see TF-100 et seq. in List No. sequence.

CUPBOARDS, apparatus } see FURNITURE
fume }
first aid see FIRST AID
CYCLONE EVAPORATOR see *Quickfit* APPARATUS
CYLINDERS, gas see GAS CYLINDERS
Nessler see COLORIMETERS

Items on this page normally available from stock except those coded *N*.

Technico GRADUATED CYLINDERS

REGD. TRADE MARK

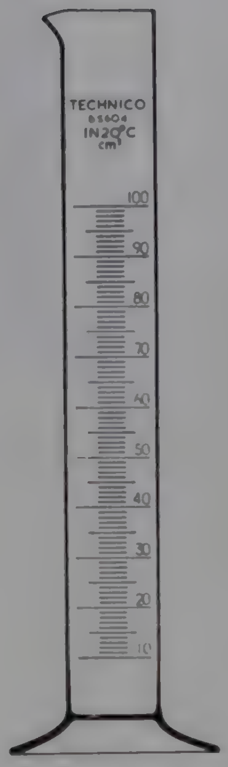
Technico graduated cylinders are manufactured in our own factory to comply with the requirements of BS 604, (except the 200 cm³ size which is not included in the BS). The volumetric tolerances are as shown below.

Extract from BS 604

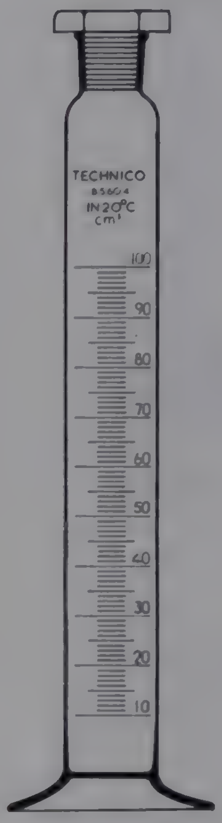
To contain	cm³	5	10	25	50	100
Subdivided in	cm³	0·1	0·2	0·5	1	1
Tolerance	±cm³	0·1	0·15	0·25	0·5	0·8
To contain	cm³	200	250	500	1000	2000
Subdivided in	cm³	2	2	5	10	20
Tolerance	±cm³	—	1·5	2·0	4·0	8·0

Technico stoppered cylinders up to 500 cm³ have interchangeable socket necks to BS 572 fitted with polypropylene hexagonal head dustproof stoppers. These stoppers are inert to almost all reagents and provide protection against the rim of the cylinder becoming chipped. If on occasions, for special purposes, glass stoppers are essential then stoppers SU-520 are suitable.

Cylinders of 1000 and 2000 cm³ have well ground, individually fitted glass stoppers.



CY-224



CY-244

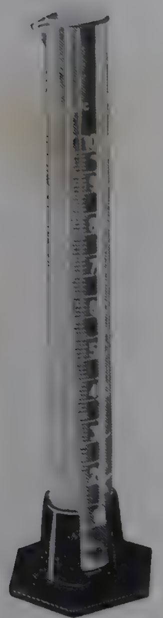
CYLINDERS with spout

List No.	Capacity cm³	5	10	25	50	100	200	250	500	1000	2000	
	Subdivided cm³	0·1	0·2	0·5	1·0	1·0	2·0	2·0	5·0	10·0	20·0	
CY-224	*Technico* Dozen	59/-	62/-	68/-	78/-	90/-	160/-	125/-	185/-	255/-	400/-	*a*
	Each	6/2	6/4	6/10	7/8	8/6	14/6	11/3	17/-	23/6	36/-	
CY-225	*Technico* with Works Certificate Each	18/-	18/6	21/-	23/-	25/-	36/-	32/-	39/-	50/-	72/-	*a*
CY-229	*Technico* with BST Certificate Each	55/-	56/-	57/6	59/6	61/-	—	77/-	82/6	105/-	123/6	*a*

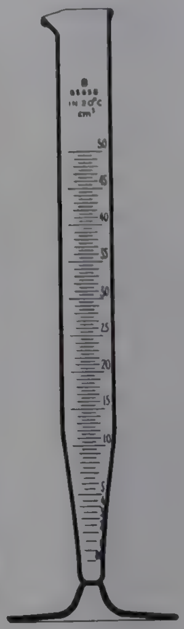
CYLINDERS with stopper

List No.	Capacity cm³	5	10	25	50	100	250	500	1000	2000	
	Subdivided cm³	0·1	0·2	0·5	1·0	1·0	2·0	5·0	10·0	20·0	
	Stopper size	10/13	10/13	14/15	14/15	19/17	24/20	24/20	—	—	
CY-244	*Technico* Dozen	82/-	84/-	96/-	114/-	135/-	240/-	360/-	440/-	660/-	*a*
	Each	7/10	8/-	9/-	10/3	12/3	22/-	33/-	40/-	60/-	
CY-245	*Technico* with Works Certificate Each	19/-	21/-	23/-	26/6	28/-	40/-	57/-	68/-	92/-	*a*
CY-249	*Technico* with BST Certificate Each	56/-	58/-	59/6	62/6	63/6	83/6	97/6	120/-	140/-	*a*

All items on this page normally available from stock.



CY-270



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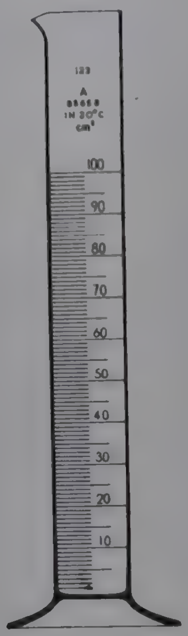


CY-316

CY-353
CY-362

CYLINDERS, graduated, *Pyrex brand* glass, to BS 604, with pressed hexagonal foot.

Capacity	CY-254 with spout			CY-264 stoppered			
	Std. pack qty.	Std. pack	Each	Std. pack qty.	Std. pack	Each	
cm³							
10	12	119/–	11/–	12	174/–	16/2	d
25	12	121/–	11/3	12	183/–	17/–	d
50	12	129/–	12/–	12	202/–	18/9	d
100	6	71/–	13/3	12	240/–	22/3	d
250	6	94/–	17/6	12	283/–	26/3	d
500	6	135/–	25/–	12	372/–	34/6	d
1000	4	113/–	31/6	6	304/–	56/5	d
2000	4	162/–	45/–	4	231/–	64/4	d

CY-270

CYLINDERS, graduated, with spout, *Pyrex brand* glass, with detachable polythene foot.

Capacity	50	100	250 cm³	
Std. pack of 12	57/–	65/–	92/–	d
Each	6/–	6/8	8/9	

CY-271 **Glass part only** for CY-270.

Capacity	50	100	250 cm³	
Std. pack of 12	49/–	56/–	79/–	d
Each	5/6	6/–	7/8	

CY-275

CYLINDERS, graduated, *Pyrex brand* glass, with detachable polythene foot and interchangeable plastics stopper.

Capacity	50	100	250 cm³	
Stopper size	14/15	19/17	24/29	
Std. pack of 12	86/–	96/–	138/–	d
Each	8/3	9/–	12/10	

CY-276 **Glass part only** for CY-275.

Capacity	50	100	250 cm³	
Std. pack of 12	68/–	78/–	110/–	d
Each	7/–	7/8	10/2	

CY-280

CYLINDERS, graduated, Corex glass. See Addenda.

DISTILLATION RECEIVERS to BS 658, Crow, type 1.

	Capacity	cm³	25	50	100	
CY-304	*Technico* Class B	Doz. Each	200/– 18/–	210/– 19/–	230/– 21/–	a

DISTILLATION RECEIVERS, to BS 658, cylindrical, type 2.

	Capacity	cm³	100	200	
CY-314	*Technico* Class B	Doz.	170/–	230/–	a
		Each	15/6	21/–	
CY-316	*Technico* Class A	Doz.	370/–	480/–	a
		Each	34/–	44/–	

***CY-353**

CYLINDERS, polypropylene, with pouring spout and moulded calibrations within BS 604 tolerances. This material is more transparent than polythene.

To contain	10	25	50	100 cm³	
Subdivided	0·1	0·5	1	1 cm³	
Dozen	71/–	89/3	103/3	142/–	m
Each	6/6	8/–	9/8	13/6	
To contain	250	500	1000	2000 cm³	
Subdivided	2	5	10	20 cm³	
Dozen	184/–	273/–	339/–	652/–	m
Each	15/10	24/–	30/–	58/–	

***CY-362**

CYLINDERS, transparent acrylic, with pouring spout and moulded calibrations within BS 604 tolerances.

To contain	10	25	50	100 cm³	
Subdivided	0·1	0·5	1	1 cm³	
Dozen	59/–	84/–	122/9	161/6	m
Each	5/9	8/–	11/–	14/9	
To contain	250	500	1000	2000 cm³	
Subdivided	2	5	10	20 cm³	
Dozen	211/–	352/–	451/6	735/–	m
Each	19/–	32/–	41/3	70/–	

HT-500

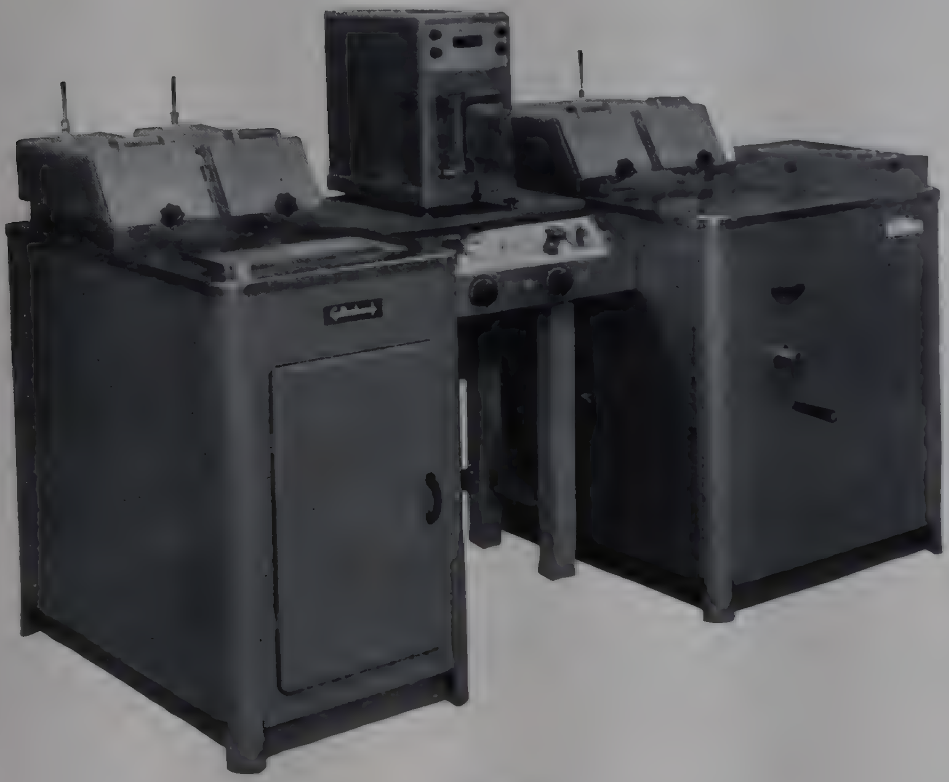
CYLINDERS, ungraduated, for use as hydrometer jars. For details see entry in List No. sequence.

All items on this page normally available from stock.

Technico DAIRY PRODUCTS TEST UNIT

REGD. TRADE MARK

For rapid and accurate routine determinations of fats, total solids and moisture in dairy and allied food products.



DB-100

The unit is designed to reduce the time and labour normally entailed in evaporating, drying and weighing operations. Fats are extracted by means of a centrifuge, hotplate vacuum ovens are used for evaporating and drying, and samples are cooled in water-cooled desiccators.

The unit permits determinations of both fats and total solids to be carried out simultaneously by one operator from one bench position, a factor which makes for speed and renders the unit ideal for multiple routine determinations.

The main sub-assemblies include:—

Solids determination sub-assembly comprising a thermostatically controlled vacuum oven with a tray for the drying agent, a cooled desiccator and a flush-mounted hotplate built on a sheet steel fabricated cupboard which is used for storage of glassware and metal dishes.

Fats determination sub-assembly similar to the solids determination sub-assembly but with a hooded hot-plate and including an 8-position hand-driven centrifuge. The base of this section houses the power unit and is fan ventilated to remove any inflammable vapours.

Power unit incorporating a $\frac{1}{3}$ hp induction motor which, through two V-belts, drives an oil immersed, 48 litres/min vacuum pump and a powerful extraction fan. A separate 1/30 hp motor drives the 300 litres/min coolant pump.

Control panel. All electrical and vacuum controls are grouped into a desk control panel between the solids and fats sub-assemblies. Electrical controls include the mains switch, separate switches for two motors and ovens, two energy regulators for the hotplates, two electrical timers and alarm reset switches. Vacuum controls comprise two valves and their respective gauges.

Coolant tank. This is mounted at the rear of the centre section and is a large surface area tank which maintains the coolant practically at room temperature so that samples may be cooled prior to weighing.

Balance table. A strong wooden teak table which is independently mounted so as to be vibration-free. It is suitable for mounting a modern aperiodic balance provided the floor is firm.

Reagents dispensary with reagent reservoir and three 100 cm³ and two 20 cm³ vacuum filling auto burettes.

Details and quotations on application.

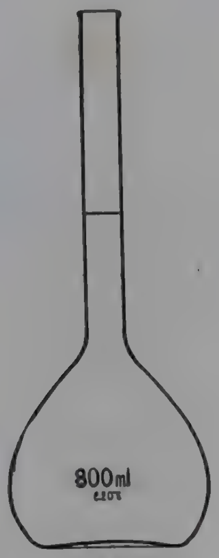
Please state voltage and nature of supply.

BACTERIOLOGICAL TESTS

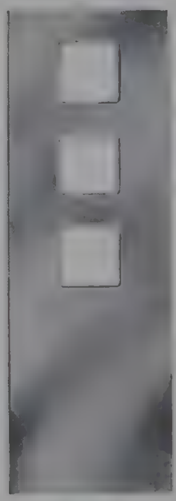
COLIFORM TEST to BS 895, for detecting bacteria of the coli-aerogenes group.

PM-344	**Pipettes,** graduated, *Technico.*
TF-122	**Durham tube,** 35 × 8 mm dia.
TF-128	**Test tube,** dilution, 150 × 19 mm dia.
TF-128	**Test tube,** 150 × 16 mm dia.
WF-360 et seq.	**Water baths, thermostatic,** stainless steel, electrically heated.
WF-390	**Rack,** with numbered positions to hold ten tubes for incubation in water bath.

For details and prices see entries in List No. sequence.



DB-200



DB-280

Gallenkamp

IH-100

METHYLENE BLUE REDUCTION TEST to test the keeping quality of pasteurised milk.

DB-200

FLASK, 800 cm³, unstoppered, for the preparation of methylene blue solution.

Dozen **£7.10. 0.** Each **£0.15. 2.** *m*

DB-210

PIPETTE, blow-out, one mark, 1 cm³.

Std. pack of 72 **£6.18. 0.** Each **£0. 3. 7.** *m*

DB-220

TEST TUBE, rimless, 150 × 16 mm dia., with ring graduation at 10 cm³ and sandblast badge for pencil notations.

Std. pack of 72 **£1.12. 0.** Dozen **£0. 6. 6.** *m*

SU-760	**Rubber stopper,** size No. 13, for closing tubes DB-220.
SR-800	**Sterilising box,** for pipettes, 38 cm long × 5·7 cm dia.
WF-360 et seq.	**Water baths, thermostatic,** electrically heated.
WF-390	**Rack,** with numbered positions to hold ten tubes DB-220. for incubation in water bath.

For prices of above see entries in List No. sequence.

MICROSCOPE COUNT, a method enabling rapid assessment of the bacterial content of milk using Newman's stain.

DB-280

GUIDE PLATE, stainless steel, for spreading a standard volume of milk in an even film over 1 cm² of a glass slide.

Dozen **£6.10. 0.** Each **£0.11. 9.** *m*

DB-282

PIPETTE, dropping, capillary, 0·01 cm³.

Dozen **£4. 4. 0.** Each **£0. 8. 0.** *m*

RV-220	**Rubber teat,** size No. 1, for DB-282.
HJ-710	**Microscope slide,** 75 × 25 mm, obscured edge. Thickness 1·0 to 1·2 mm.
	Microscope, binocular, see **MICROSCOPES.**
CX-560	**Needle holder,** with brass chuck and light aluminium handle for holding wire CX-570 and CX-580.
CX-570	**Wire, platinum-iridium,** 0·5 mm dia.
CX-580	**Wire, nickel chromium,** 0·5 mm dia.

For prices of above see entries in List No. sequence.

PLATE COUNT, the classical method for estimating numbers of bacteria in milk and other materials.

DB-210	**Pipette, blow out,** 1 cm³.
CX-240 et seq.	**Petri dishes,** for plating milk with nutrient medium.
CX-300	**Colony counter,** *Gallenkamp,* for counting bacteria.
IH-100	**Incubator,** *Gallenkamp,* electrically heated and thermostatically controlled, for incubating Petri dishes at 37°C.
SR-820	**Sterilising box,** for Petri dishes.

For prices of above see entries in List No. sequence.

All items on this page normally available from stock.

FATS DETERMINATION

GERBER METHOD, to BS 696, for the determination of the percentage of fats in milk and its products.

BUTYROMETER TUBES, to BS 696, with plain neck for lock stoppers DC-130.

List No.	Application	Capacity	Range	Dozen	Each	
DC-030	Skim milk	10·94 cm³	4% in 0·1	**135/–**	**12/3**	*m*
DC-032	Milk	10·94 cm³	8% in 0·1	**145/–**	**13/4**	*m*
DC-034	,,	10·94 cm³	10% in 0·2	**162/–**	**14/9**	*m*
DC-036	Cheese	3 g	40% in 1·0	**160/–**	**14/6**	*m*
DC-038	Cream	5 g	70% in 1·0	**160/–**	**14/6**	*m*

Butyrometer tubes with corrugated neck and in other qualities, also large quantities of above tubes, quotation on application.

DC-130

STOPPERS, LOCK, for tubes with plain necks.
Dozen **£0. 17. 0.** Each **£0. 3. 0.** *m*

DC-132

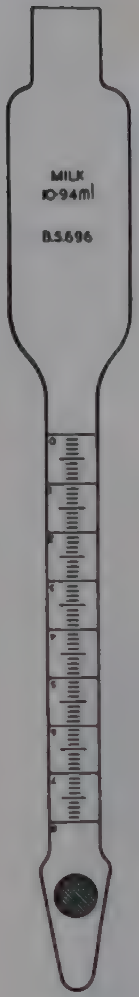
KEY, for lock stoppers DC-130; one key sufficient for any number of stoppers ... ... Each **£0. 5. 3.** *m*

DC-150

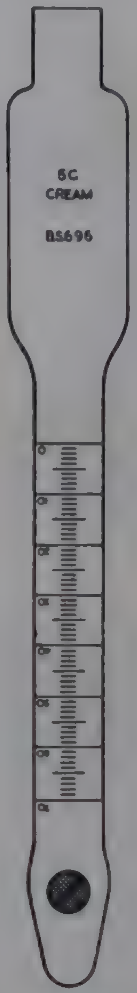
BRUSH, for cleaning butyrometer tubes.
Dozen **£0. 19. 0.** Each **£0. 3. 2.** c

PIPETTES, *Technico,* to BS 696.

List No.	To deliver	Capacity	Dozen	Each	
DC-200	Amyl alcohol	1 cm³	**42/–**	**4/11**	*a*
DC-210	Sulphuric acid	10 cm³	**62/–**	**6/4**	*a*
DC-220	Milk	10·94 cm³	**66/–**	**6/8**	*a*



DC-032



DC-038

DC-200

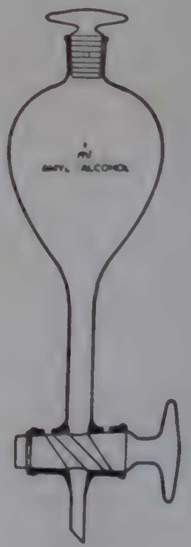
DC-210

DC-220

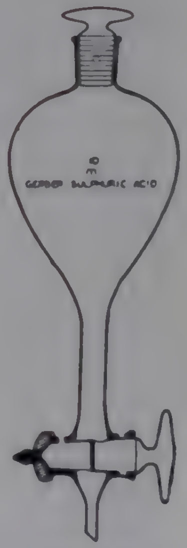
AUTOMATIC MEASURES, to BS 696.

List No.	To deliver	Capacity	Each	
DC-230	Amyl alcohol	1 cm³	**93/6**	*m*
DC-240	Sulphuric acid	10 cm³	**107/6**	*m*

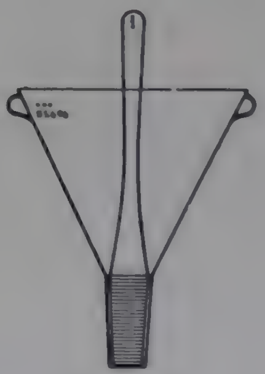
PM-714 **Measure, automatic,** for delivering 10 cm³ quantities of sulphuric acid for the Gerber test. For price see entry in List No. sequence.



DC-230



DC-240



DC-260

DC-260

FUNNEL, glass, (AG), to BS 696, for weighing cream or cheese for the Gerber and Babcock tests. Fitted with standard joint 7/16 and hollow stopper.
Dozen **£13. 15. 0.** Each **£1. 5. 0.** *a*

All items on this page normally available from stock.

DC-360 with DC-364 (rheostat not illustrated)

DC-360

CENTRIFUGES, Gerber, electrically operated by $\frac{1}{4}$ hp universal motor to run at approximately 1100 rev/min, using the speed regulating rheostat supplied as a separate unit. For 230/250V a.c. single phase or d.c. supplies. To take heads DC-368 from 8 to 24 tubes. **With rheostat but without head or speed indicator.**
Each **£28. 8. 0.** *f*

ACCESSORIES

DC-364 **Speed indicator,** bubble type, for DC-360.
Each **£3. 3. 0.** *f*

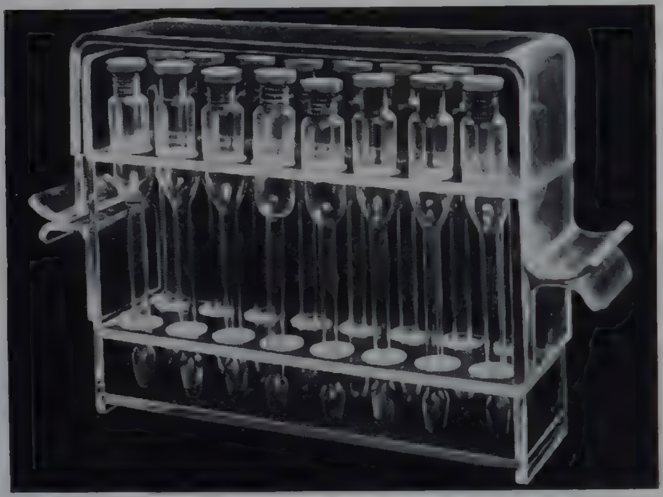
DC-368 **Heads,** to fit DC-360.

To take	8	12	16	24 tubes	
Each	**201/–**	**219/–**	**237/–**	**273/–**	*f*

DC-450

STAND, clear plastics, for butyrometer tubes, complete with plastics cover protecting operator against acid splash. To take 12 tubes.
Each **£5. 15. 0.** *m*

Thermostatic water baths and racks for butyrometers, details on application.



DC-450

FATS by RÖSE-GOTTLIEB method.

This method described in BS 1741 depends on the breaking down of fat particles and subsequent extraction with ether. The extraction tubes are available with either short or long (siphon) delivery tubes and a 19/17 stopper is supplied with each tube for closure when shaking.

List No.		Dozen	Each	
DC-702	**Short tube pattern** (AG)	**170/–**	**15/6**	*a*
DC-706	**Long tube pattern** (AG)	**170/–**	**15/6**	*a*

FREEZING POINT OF MILK by the Hortvet method, for the determination of the amount of added water in accordance with BS 3095.

DC-800

CRYOSCOPE, Hortvet, using ether to super-cool the sample. The apparatus, complete with all accessories except thermometers, is mounted on a stand and conforms to the requirements of BS 3095. With electrically driven stirrer and air compressor. For 110 or 200/250V 50 Hz single phase supplies. Each **£69. 0. 0.** *fN*

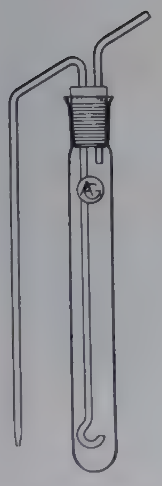
When ordering please state voltage and nature of supply.

DC-806

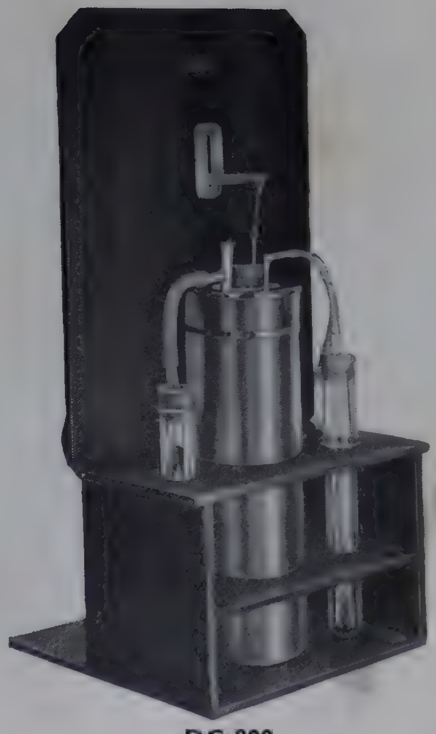
THERMOMETER, Hortvet, to BS 3095, scale span −2·0°C to +1·0°C in 0·01°C, for partial (175 mm) immersion. Overall length 660 mm, stem diameter 8 to 10 mm ... ... Each **£9. 15. 0.** c

DC-808

THERMOMETER, Hortvet, to BS 3095, scale span −5°C to +5°C in 0·5°C for partial (200 mm) immersion. Overall length about 470 mm, stem diameter 6 to 8 mm.
Each **£5. 8. 0.** c



DC-706



DC-800

Items on this page normally available from stock except those coded *N.*

HYDROMETERS, to BS 734, for use in milk testing (LACTOMETERS)

DC-900

DENSITY HYDROMETERS, for use in normal milk; range 1·025 to 1·035 g/cm³.

No.	Length mm	Divisions g/cm³	Each	
1	245	0·0002	**23/–**	*m*
2	220	0·0005	**22/–**	*m*
3	165	0·0005	**21/–**	*m*

MOISTURE IN BUTTER DETERMINATION,

to BS 769, requires apparatus which may be selected from the following:

BA-810	**Balance,** *Mettler* P160, direct reading.
	Balances, other patterns by Mettler, Oertling and Stanton will be found listed under the heading **BALANCES.**
BH-220	**Basin,** nickel, flat form, 7 cm dia.
BH-230	**Basin,** as BH-220, but with cover.
BH-280	**Basin,** stainless steel, flat form, 7 cm dia.
BH-285	**Basin,** as BH-280, but with drop-in cover.
OV-160	**Oven,** drying, to BS 2648, electrically heated, for temperatures up to 250°C, with thermostatic control.
MV-600	**Oven,** vacuum, for moisture determinations. For temperatures up to 140°C, with thermostatic control.
	For details and prices of above see entries in List No. sequence.

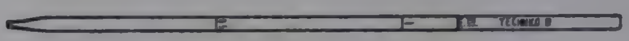
PHOSPHATASE TEST, for pasteurised milk.

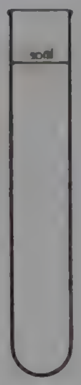
Destruction of phosphatase enzyme in milk by pasteurisation as indicated by its activity on various phenolic substances is accepted as a measure of the destruction of **Myco tuberculosis,** the most heat resistant of the ordinary pathogenic bacteria to be found in milk.

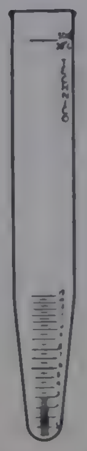
DE-120

PIPETTE, *Technico,* **blow-out,** two mark, 0·5 and 1·0 cm³ ... Dozen **£1.14. 0.** Each **£0. 4. 4.** *a*

DB-210	**Pipette, blow-out,** 1 cm³.
DB-220	**Test tube,** 150 × 16 mm, with one mark at 10 cm³.
WF-360 et seq.	**Water baths, thermostatic.**
WF-390	**Rack,** with numbered positions to hold ten tubes 150 × 16 mm.
	For prices of above see entries in List No. sequence.
	Lovibond comparators with colour grading disks for Kay and Graham and for Aschaffenburg and Mullen phosphatase tests, detailed quotation on application.


DE-120


DE-250


DE-600

RESAZURIN TEST for the determination of the keeping quality of fresh milk.

Active bacteria in milk reduce resazurin (blue) to resourfin (pink) and finally to dihydroresourfin (white), enabling the use of a colour comparator with suitably graded colour standards.

DE-250

TEST TUBES, 150 × 25 mm, with one mark at 50 cm³. Dozen **£0.15. 0.** Each **£0. 2.11.** *c*

BT-245	**Bottle,** wide mouth, 60 ml.
SU-760	**Stopper,** rubber, for DE-250, size No. 23.
SM-828	**Stand,** test tube.
DB-210	**Pipette, blow-out,** 1 cm³.
WF-360 et seq.	**Water baths,** with thermostatic control.
WF-390	**Test tube rack** for above.
	For prices of above see entries in List No. sequence.
	Lovibond comparator with colour grading disk for resazurin test, detailed quotation on application.

DE-600

SOLUBILITY INDEX TUBE, *Technico,* 50 cm³, graduated 0·1 cm³ from 0·5 to 1 cm³, 0·2 cm³ from 1 to 3 cm³, and 0·5 cm³ from 3 to 15 cm³. Accepted by Gerber centrifuges DC-360. Dozen **£8.15. 0.** Each **£0.16. 0.** *a*

All items on this page normally available from stock.

DEIONISERS

In this section is listed a range of mixed bed and separate column deionisers which will meet all normal laboratory requirements for water of very high purity.

PERFORMANCE

The treated water is normally of very high electrical resistance and can be equivalent to or better than that produced by triple distillation in quartz. The total capacity between regenerations and flow-rate at a particular conductivity are determined by the total cation content including dissolved gases. Silica and carbon dioxide are removed by most models but the water is not necessarily free from pyrogens and is, therefore, unsuitable as water for injection. Deionised water conforms to British Pharmacopoeia Specification for purified water.

MIXED BED TYPE

In the mixed bed type, the anion and cation exchange resins are intimately mixed. Once exhausted the columns are either regenerated by the manufacturer or by the user with hydrochloric acid and sodium hydroxide.

SEPARATE COLUMN TYPE

The exchange resins, in the separate column type, are in two cylinders connected in series. Acid formed in the cation exchange column is removed by the anion resin in the second column. These columns are regenerated by the user with hydrochloric acid and sodium carbonate or hydroxide. Only comparatively brief descriptions of the deionisers are given. Full details are available on request.

List No.	Type	Capacity in litres between regeneration using water			Flow rate litres/hr	Regeneration method	Average effluent quality ohm/cm^3	Effluent purity		Effluent pH
		Dist.	Soft	Hard				Silica ppm	CO_2 ppm	
DH-600	Mixed-bed	315	200	20	10	Replace cartridge	2×10^6	0·1	Nil	6·5 to 7
DH-610	,,	600	360	30	15	,, ,,	4×10^6	0·1	,,	,,
DH-630	,,	1500	900	70	50	,, ,,	2×10^6	0·1	,,	6·5 to 7
DH-635	,,	3000	2000	130	70	,, ,,	2×10^6	0·1	,,	,,
DH-640	,,	6000	4000	160	90	,, ,,	2×10^6	0·1	,,	,,
DH-650	,,	36,000	850	70	22	*In-situ*	$5\text{–}20\times10^6$	0·05	,,	7
DH-655	,,	4500	2000	150	45	Replace cartridge	5×10^6	0·05	,,	7
DH-680	,,	4500	1000	80	54	,, ,,	5×10^6	0·05	,,	6·5 to 7
DH-685	,,	13,000	3000	200	120	,, ,,	1×10^6	0·05	,,	6·5 to 7
DH-700	Two-bed	—	1800	240	27	*In-situ*	1×10^3	10	180	4 to 5
DH-705	,,	—	1100	90	27	,,	1×10^3	0·2	Nil	8·5 to 9·5
DH-730	,,	—	6000	900	60	,,	1×10^3	10	180	4 to 5
DH-735	,,	—	4000	290	60	,,	1×10^3	0·2	Nil	8·5 to 9·5

Elgastat Minor Type C403
Portable Deioniser
EXHAUSTION LINE

DH-600

DH-600

DEIONISER, *Elgastat* **C403,** a small mixed bed unit in a polythene container, employing an indicator which turns from blue-black to yellow as the exchange resin charge is exhausted. Flow rate 10 litres/hr. Capacity between regeneration varies from 20 litres using hard water to 315 litres using distilled water. **It is primarily intended for the purification of distillate from metal or glass stills.**

The purchase of two units is recommended to ensure uninterrupted supplies of purified water, one being used while the other is sent away for exchange for a regenerated unit (home trade only) ... Each **£5. 0. 0.** *f*

All items on this page normally available from stock.

DH-610

DEIONISER, *Elgastat* **B102,** a portable, self-contained unit consisting of a 2·25 litres storage tank, a mixed bed cartridge, a control valve, a measuring cell and a conductivity meter calibrated 0–4 reciprocal megohm/cm^3, mounted on a plastics stand, 35 × 70 cm high. Flow rate 15 litres/hr capacity between regeneration varies between 30 litres and 600 litres depending on hardness of input water. All containers and pipelines are in polythene. For 200/250V a.c. supplies only ... Each **£39. 0. 0.** *f*

NOTE: The initial purchase of a cartridge pack is recommended to ensure uninterrupted supplies of purified water. Cartridges must be returned to the manufacturer for regeneration; cartridge exchange voucher books are issued for this purpose and are obtainable only from the manufacturer.

REPLACEMENT PART

DH-612 **Cartridges,** in pack of six ... ... Pack **£13. 0. 0.** *f*

DH-620

DEIONISER, *Elgastat* **B102,** as DH-610 but **export model.** For 200/250V a.c. supplies only. Each **£50. 0. 0.** *f*

Price on application for 110V a.c. supplies or battery operation.

REPLACEMENT PART

DH-622 **Export pack** of nine polythene bags each containing 500 g of mixed exchange resin ... Pack **£12. 0. 0.** *f*

DH-630

DEIONISER, *Elgastat* **B125,** a bench mounting mixed bed cartridge deioniser with an output of up to 50 litres/hour of purified water from tap water. The water produced meets the BP requirements for purified water and has an average quality of 2×10^6 ohms/cm^3 and pH between 6·5 and 7·0. Capacity between regeneration varies from about 70 litres to 1500 litres depending on the hardness of the input water. The mixed bed resin is contained in a transparent plastics cylinder, and an indicator dye in the resin shows a progressive colour change as the cartridge is exhausted. A mains operated conductivity meter mounted above the resin cylinder continuously monitors the effluent. An inlet nozzle suitable for 10 mm bore flexible tubing and a plastics outlet tube are provided. The outlet tube must not be restricted.

Maximum supply pressure	0·7 kg/cm^2 (10 lb/in^2)
Electrical supply	200/250V a.c. supplies only
Overall dimensions	16 cm dia. × 46 cm high
Weight	4·5 kg

Each **£21. 0. 0.** *f*

NOTE: The initial purchase of a cartridge pack is recommended to ensure uninterrupted supplies of purified water. Cartridges must be returned to the manufacturer for regeneration; cartridge exchange voucher books are issued for this purpose and are obtainable only from the manufacturer.

REPLACEMENT PART

DH-632 **Cartridge** ... ... Each **£7. 0. 0.** *f*

DH-633

DEIONISER, *Elgastat* **B125,** as DH-630 but **export model.** For 200/250V a.c. supplies only. Each **£27. 0. 0.** *f*

Prices on application for 110V a.c supplies or battery operation.

REPLACEMENT PART

DH-634 **Export pack** of ten replacement mixed bed resin charges Pack **£23. 0. 0.** *f*

Elgastat Deioniser
Type B102

DH-610

DH-630
DH-635

DH-635

DEIONISER, *Elgastat* **B126,** as DH-630 but having an output of up to 70 litres/hour of purified water, and a capacity between regeneration which varies from about 130 litres to 3000 litres depending on the hardness of the input water.

Maximum supply pressure	0·7 kg/cm^2 (10 lb/in^2)
Electrical supply	200/250V a.c. supplies only
Overall dimensions	16 cm dia. × 81 cm high
Weight	5·6 kg

Each **£33. 0. 0.** *f*

NOTE: The initial purchase of a cartridge pack is recommended to ensure uninterrupted supplies of purified water. Cartridges must be returned to the manufacturer for regeneration; cartridge exchange voucher books are issued for this purpose and are obtainable only from the manufacturer.

REPLACEMENT PART

DH-637 **Cartridge** ... ... Each **£13. 0. 0.** *f*

DH-638

DEIONISER, *Elgastat* **B126,** as DH-635 but **export model.** For 200/250V a.c. supplies only. Each **£37. 0. 0.** *f*

Price on application for 110V a.c. supplies or battery operation.

REPLACEMENT PART

DH-639 **Export pack** of five replacement mixed bed resin charges. Pack **£23. 0. 0.** *f*

WATER STILLS see DT-580 et seq. in List No. sequence.

All items on this page normally available from stock.

DH-640

DH-640

DEIONISER, *Elgastat* **B113,** self-contained mixed bed cartridge deioniser with an output of up to 90 litres/hour of purified water from tap water. The water produced meets the BP requirements for purified water and has an average quality of 2×10^6 ohms/cm^3 and pH between 6·5 and 7·0. Capacity between regeneration varies from about 160 litres to 6000 litres depending on the hardness of the input water. The built-in conductivity monitor provides a continuous check on quality. A fibreglass cover is provided with suitable apertures for the inlet control tap and conductivity monitor.

Maximum supply pressure	0·7 kg/cm^2 (10 lb/in^2)
Electrical supply	200/250V a.c. supplies only
Overall dimensions	27 cm wide × 24 cm deep × 51 cm high
Weight	7·5 kg

Each **£35. 0. 0.** *f*

NOTE: The initial purchase of a reserve cartridge is recommended to ensure uninterrupted supplies of purified water. Cartridges must be returned to the manufacturer for regeneration; cartridge exchange voucher books are issued for this purpose and are obtainable only from the manufacturers.

REPLACEMENT PART

DH-641 Cartridge ... ... Each **£16. 10. 0.** *f*

DH-650

DEIONISER, *Raleigh* **Model 1,** a mixed bed ion-exchange unit, designed for regeneration *in situ* by the user. Flow rate 22 litres/hr. Capacity between regeneration varies from 70 litres to 36,000 litres depending on the hardness of the input water. Incorporates a transistorised a.c. bridge conductivity meter calibrated in quality zones and spot megohm/cm^3 values. The exchange resins fill approximately half the clear plastics cylinder 9 cm dia. × 80 cm high which is supported on a plastics baseplate. Complete with step-down transformer and instructions for operation and regeneration. For 100/110 and 200/250V a.c. supplies only.

Each **£60. 0. 0.** *mN*

REPLACEMENT PART

DH-652 Recharge of mixed resins ... ... Each **£6. 0. 0.** *mN*

DH-655

DEIONISER, *Raleigh* **Model 40,** a self-contained bench mounting mixed bed cartridge deioniser with an output of up to 45 litres/hour of conductivity water from tap water. The water produced has an average quality of 5×10^6 ohms/cm^3 and a pH of 7·0. Capacity between regeneration varies from about 150 litres to 4500 litres depending on the hardness of the input water. The mixed bed resin is contained in a clear plastics cylinder, 9 cm dia. × 60 cm high, which slides into a rigid plastics base. An indicator dye incorporated in the resin shows a progressive colour change as the cartridge is exhausted. A tapered inlet nozzle for up to 12·7 mm bore flexible tubing, and an outlet nozzle for 6·3 mm bore flexible tubing are provided.

Maximum supply pressure	approx: 1·4 kg/cm^2 (20 lb/in^2)
Overall dimensions	20 cm dia. × 79 cm high
Weight	4·5 kg

Each **£19. 17. 6.** *mN*

NOTE: This price does not include a spare cartridge or cartridge exchange vouchers. Cartridges must be returned to the manufacturer for regeneration. A book of cartridge exchange vouchers is available only from the manufacturer.

REPLACEMENT PART

DH-657 Cartridge ... ... Each **£16. 0. 0.** *mN*

DH-650

DH-655

Items on this page normally available from stock except those coded *N.*

DH-680

DEIONISER, *Permutit* **Mark 7,** a self contained portable deioniser with mixed bed cartridge and battery operated conductivity meter housed in a plastics case. Up to 54 litres/hour of conductivity water, having an average quality 5×10^6 ohms/cm^3 and pH between 6·5 and 7, can be produced direct from tap water. Capacity between regeneration varies from about 80 litres to 4500 litres depending on the hardness of the input water.

Minimum supply pressure	0·35 kg/cm^2 (5 lb/in^2)
Maximum supply pressure	3·5 kg/cm^2 (50 lb/in^2)
Overall dimensions	57×21 cm dia.
Weight	4 kg

Complete with inlet and outlet valves, one spare cartridge and book of 5 vouchers for cartridge exchange service.

Each **£35. 10. 0.** *m*

REPLACEMENT PART

DH-682 Cartridge, Mark 7 ... ... Each **£5. 10. 0.** *m*

DH-680

DH-685

DEIONISER, *Permutit* **Mark II,** a self-contained deioniser with mixed bed cartridge, and battery operated conductivity meter housed in a plastics case, which can be wall or bench mounted. Up to 120 litres/hour of conductivity water, having an average quality greater than 1×10^6 ohms/cm^3 and pH between 6·5 and 7·0, can be produced direct from tap water. Capacity between regeneration varies from about 200 litres to 13,000 litres depending on the hardness of the input water.

Minimum supply pressure	0·5 kg/cm^2 (7 lb/in^2)
Maximum supply pressure	3·5 kg/cm^2 (50 lb/in^2)
Overall dimensions	$28\times21\times70$ cm high
Weight	12·7 kg

Complete with flexible inlet hose and adapter for 12·7 mm diameter water tap, one spare cartridge and a book of 5 vouchers for cartridge exchange service.

Each **£53. 12. 6.** *f*

DH-685

REPLACEMENT PART

DH-687 Cartridge Mark II ... ... Each **£15. 0. 0.** *m*

All items on this page normally available from stock.

DH-700

DH-730

DH-700
DEIONISER, *Permutit* **Mark 9 E,** with 'Zeo-Karb' cation and weakly basic 'De-Acidite E' anion exchange columns. Flow rate 27 litres/hr. Capacity between regeneration varies from about 200 to 1800 litres depending on the hardness of the input water. The columns together with a battery operated conductivity tester calibrated 0 to 40 megohm^{-1}/cm^{3} and a multivalve control unit, are mounted in a moulded case provided with a carrying handle. Flexible tubes are provided for inlet, outlet and regeneration solutions. Suitable for water pressures up to 3·5 kg/cm^{2}. Each **£50. 0. 0.** *m*

DH-705
DEIONISER, *Permutit* **Mark 9 F,** as DH-700, but with strongly basic 'De-Acidite F' anion exchange resin for the production of purified water free of carbon dioxide and silicic acid for the first 25% of column life after regeneration. Flow rate 27 litres/hr. Capacity between regeneration varies from about 90 to 1100 litres depending on hardness of input water... ... Each **£50. 0. 0.** *m*

DH-730
DEIONISER, *Permutit* **Mark 8 E,** a larger and more comprehensive model than DH-700, with exchange columns 11·5 cm dia. × 51 cm high mounted on a tubular framework provided with two wheeled under-carriage and a handle. Flow rate 60 litres/hr. Capacity between regeneration varies from about 900 to 6000 litres depending on hardness of input water. The mains operated conductivity tester calibrated 0–40 megohm^{-1}/cm^{3} and a multivalve control unit are mounted on a sloping operating panel and protected by a hinged clear plastics cover. Supplied with flexible tubes for inlet, outlet and regeneration solutions, and one collapsible plastics regenerating container. For 200/250V a.c. only. Each **£106. 0. 0.** *m*

DH-735
DEIONISER, *Permutit* **Mark 8 F,** as DH-730, but with strongly basic 'De-Acidite F' anion exchange resin for the production of purified water free from carbon dioxide and silicic acid for the first 25% of column life after regeneration. Flow rate 60 litres/hr. Capacity between regeneration varies from about 290 to 4000 litres depending on the hardness of the input water.
Each **£106. 0. 0.** *m*

DENSITY APPARATUS

DJ-530
DENSITY BOTTLES, *Technico*, with capillary stopper, not adjusted.

DJ-534
DENSITY BOTTLES, *Technico*, in accordance with BS 733, IP 190 type 1 (b) and STPTC Schedule V 11, with ground-in stopper. (See next page for illustration.)

DJ-537
DENSITY BOTTLES, *Technico*, as DJ-534, but with works certificate of determined capacity.

Capacity ml	DJ-530		DJ-534		DJ-537		
	Dozen	Each	Dozen	Each	Dozen	Each	
10	**62/–**	**6/4**	**150/–**	**13/6**	**340/–**	**31/–**	*a*
25	**66/–**	**6/8**	**165/–**	**15/–**	**350/–**	**32/–**	*a*
50	**68/–**	**6/10**	**180/–**	**16/6**	**400/–**	**36/–**	*a*
100	**78/–**	**7/8**	**240/–**	**22/–**	**480/–**	**44/–**	*a*

HYDROMETERS for determination of density see HT-100 et seq. in List No. sequence.

All items on this page normally available from stock.

DJ-550

DENSITY BOTTLES, *Technico,* **Castell-Evans,** with ground-in stopper and ground-on cup.

Capacity approx.	25	50 ml	
Dozen	310/–	320/–	a
Each	28/–	29/–	

DJ-560

DENSITY BOTTLE, *Technico,* **Hubbard,** in accordance with STPTC Schedule V 12, with ground-in stopper having a central capillary and the lower surface concave. Capacity approx. 40 ml, dimensions 40 mm dia. × 70 mm high.
Each **£1. 16. 0.** *a*

DJ-570

DENSITY BOTTLES, *Technico,* **Reischauer,** with 20 mm scale on neck and 10/13 stopper.

Capacity approx.	25	50 ml	
Dozen	230/–	240/–	a
Each	21/–	22/–	

DJ-600

DENSITY BOTTLE, with ground-in thermometer and ground-glass capped side arm. Capacity 50 ml, adjusted within 5%. Thermometer scaled 15° to 30°C in 0·2°C.
Each **£4. 12. 6.** *m*

DJ-650

DENSITY BOTTLE, Rees-Hugill, to BS 2701, for direct density determinations of powdered and granular materials. Consists of a 250 ml flask with a zero line, surmounted by a tube graduated 2·70 to 2·00 g/cm³, for 100 g sample. For materials of other densities within the range 1·00 to 5·40 g/cm³, the sample weight is varied as described in BS 2701.
Each **£7. 0. 0.** *c*

DJ-670

DENSITY BOTTLE, *Technico,* **Armstrong,** for rapid measurement of the volume of irregular solids. Consists of a wide mouth stoppered bottle with a tubulure for connection to a burette. Water filling the bottle to the stem mark is sucked into the burette after which the sample is added, and the water returned to the original mark. The difference in burette readings is the volume of the sample. Without burette.
Dozen **£14. 5. 0.** Each **£1. 6. 0.** *a*

DJ-750

PYKNOMETER TUBES, *Technico,* **Nicol,** for liquids, with one mark.

Capacity	5	10	25 ml	
Dozen	84/–	96/–	108/–	a
Each	8/–	9/–	10/–	

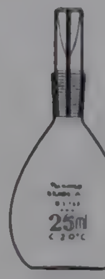
DJ-780

PYKNOMETER TUBE, *Technico,* **Sprengel,** for liquids, with two ground-on caps. Capacity from capillary end to graduation mark approx. 25 ml. This tube complies with STPTC Schedule V 13 ... Each **£1. 9. 6.** *a*

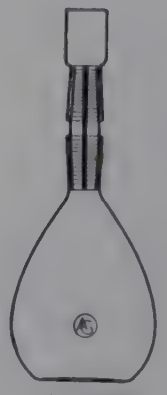
DJ-790

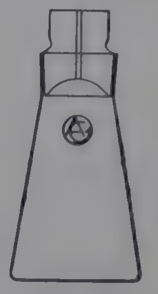
PYKNOMETERS, *Technico,* **Lipkin,** to IP 189, self-filling type with 8 cm scale. Subdivided in 1 mm on each limb.

Capacity	0·25	1	5	10 ml	
Each	28/6	28/6	28/6	28/6	a



DJ-534


DJ-550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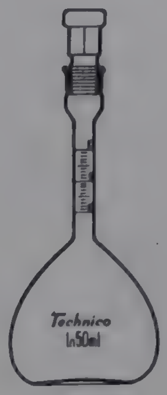

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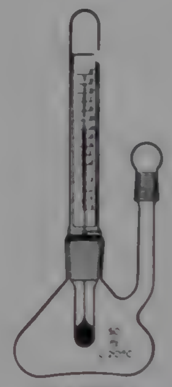
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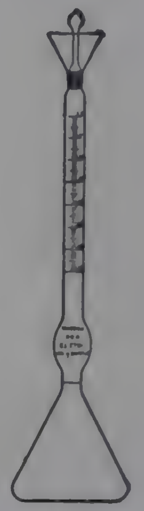
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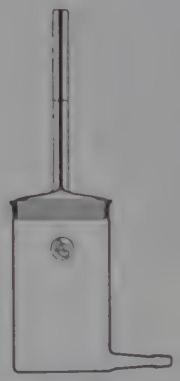
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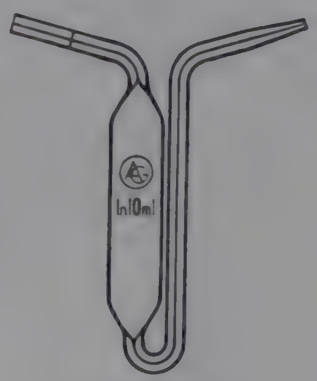
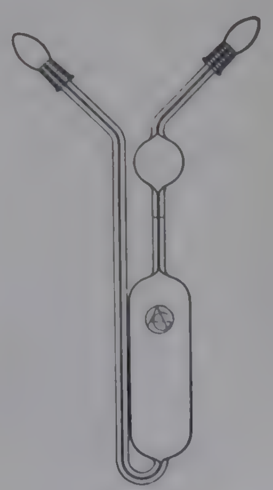


DJ-750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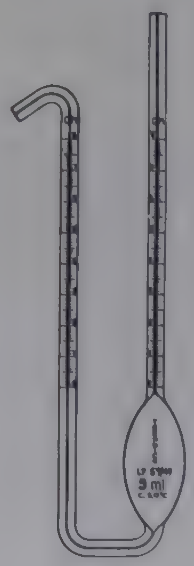
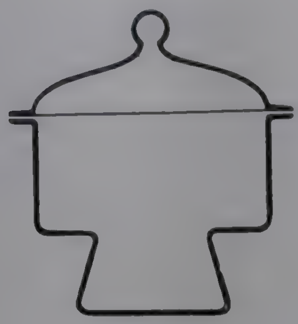
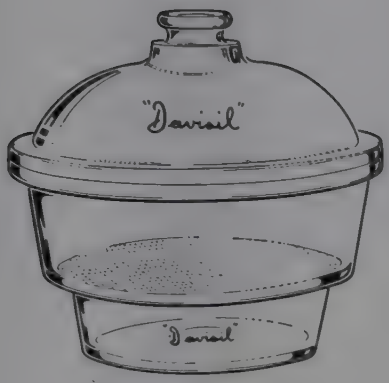

DJ-790

All items on this page normally available from stock.



DK-430



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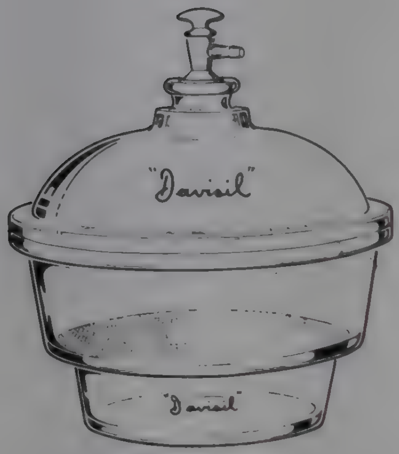

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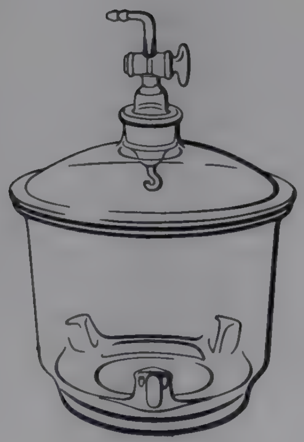

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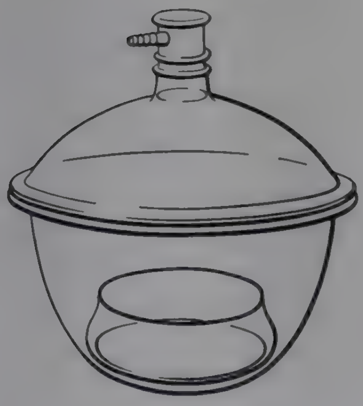


DK-490

DESICCATOR GREASE see LUBRICANTS

DK-430

DESICCATORS, Scheibler, glass, with knob cover.

Internal dia.	10	15 cm	
Each	**21/–**	**39/–**	d

DK-432 **Lids, spare, for above.**

	10	15 cm	
Each	**10/–**	**16/–**	d

DK-440

DESICCATORS, *Davisil,* **borosilicate glass,** with knob cover and expanded metal disk.

Internal dia. at top	13·6	20	27·5 cm	
Disk dia.	11·5	17·5	23 cm	
Dozen	**216/–**	**526/–**	**957/–**	d
Each	**19/10**	**48/3**	**88/–**	

DK-442 **Lids, spare, for above**

	13·6	20	27·5 cm	
Each	**8/–**	**18/9**	**33/3**	d

DK-445

DESICCATORS, *Davisil,* **borosilicate glass,** as DK-440, but vacuum pattern with ground-in interchangeable stopcock.

Internal dia. at top	13·6	20	27·5 cm	
Disk dia.	11·5	17·5	23 cm	
Joint size	14/15	29/32	34/35	
Dozen	**563/–**	**987/–**	**1450/–**	d
Each	**51/7**	**90/6**	**137/6**	

DK-446 **Stopcocks, spare, for above.**

Joint size	14/15	29/32	34/35	
Dozen	**270/–**	**286/–**	**302/–**	d
Each	**25/–**	**26/6**	**28/–**	

DK-447 **Lids, spare, for above**

	13·6	20	27·5 cm	
Each	**18/–**	**38/9**	**60/–**	d

DESICCATORS, *Pyrex brand* glass.

Int. diam. at top	cm	16·5	22	
To take disk	cm	15	20	
Joint size (DK-465)		24/29	34/35	
Std. pack qty.		2	2	
DK-460 Desiccator with knob lid.	Std. pack Each	**84/–** **47/–**	**129/–** **71/11**	d
DK-465 Desiccator with stopcock in lid.	Std. pack Each	**138/–** **77/–**	**193/–** **107/3**	d
REPLACEMENT PARTS				
DK-468 Lid with stopcock	Each	**48/4**	**61/9**	d
DK-469 Stopcock only	Each	**23/–**	**24/9**	d
ACCESSORY				
DK-470 Disk, porcelain	Each	**36/–**	**48/–**	c

DK-490

DESICCATOR, *Pyrex brand* glass, **BLWA pattern,** specially designed for vacuum use. Complete with cover with interchangeable collar stopcock, and acid container. Top dia. inside flange 29·5 cm. Plate dia. 25·5 cm. Std. pack of 2 **£11. 18. 0.** Each **£6. 12. 6.** d

REPLACEMENT PARTS

DK-492	**Cover...**			Std. pack of 2	**£7. 2. 0.**	d
DK-494	**Collar.**	Std. pack of 2	**£0. 14. 0.**	Each	**£0. 8. 0.**	d
DK-496	**Acid container**	Std. pack of 2	**£1. 16. 0.**	Each	**£1. 0. 3.**	d

ACCESSORY

DK-498	**Plate, porcelain**	Each	**£2. 0. 0.**	c

All items on this page normally available from stock.

DK-500

DESICCATORS, *Dry Seal*, **glass,** vacuum pattern with all glass stopcock with 34/35 cone and outlet suitable for connection to 8 mm bore flexible vacuum tubing. An elastomer ring located in an annular groove in the flange is compressed by the lid and so forms a perfect seal without the use of grease. Complete with perforated zinc disk.

Diameter	15	20	25 cm	
Each	**78/–**	**104/8**	**138/2**	*m*

REPLACEMENT PARTS

DK-502 **Lid,** without stopcock.

Size	15	20	25 cm	
Each	**24/10**	**27/3**	**43/–**	*m*

DK-503 **Sealing ring.**

Size	15	20	25 cm	
Each	**7/6**	**9/2**	**12/8**	*m*

DK-504 **Stopcock,** with 34/35 cone ... ... Each **£1. 3. 8.** *m*

DK-500

*DK-530

DESICCATORS, plastics, vacuum pattern, suitable for pressures down to 5 mm Hg. With polypropylene base and desiccant tray, and tough transparent polycarbonate lid. An elastomer ring located in an annular groove in the flange is compressed by the lid and so forms a perfect seal without the use of grease. The vacuum non-return valve is designed to avoid disturbing the contents when the vacuum is released and the outlet is suitable for connecting to 8 mm bore flexible vacuum tubing.

Diameter	15	20	25 cm	
Each	**100/–**	**134/6**	**221/6**	*m*

For suitable vacuum pumps see VB-040 et seq. in List No. sequence.

For suitable tubing see TX-755 in List No. sequence.

DK-530

DK-550

DESICCATOR TRIANGLES, (AG), made from glass rod, of approximately 7 mm dia.

Length of sides	50	65 mm	
Height	20	25 mm	
Dozen	**62/–**	**68/–**	*a*
Each	**6/4**	**6/10**	

DK-580

DESICCATOR DISKS, perforated zinc.

Dia.	9·5	11·5	14·5	17·5	19	23 cm	
Dozen	**20/–**	**22/6**	**26/–**	**29/6**	**35/–**	**38/–**	*c*
Each	**3/3**	**3/5**	**3/8**	**4/–**	**4/5**	**4/7**	

DK-600

DESICCATOR GUARD, for desiccators up to 20 cm nominal dia. Internal dimensions, 22·5 cm dia. × 20 cm high with sides slightly tapered to permit nesting when not in use. Constructed of polythene coated steel.
Each **£4. 8. 0.** *c*

DK-605

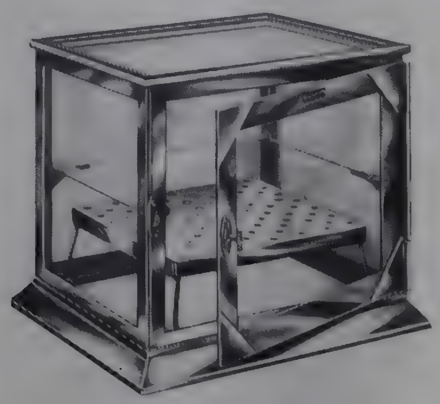
DESICCATOR GUARD, for desiccators up to 28 cm nominal dia. Internal dimensions, 37 cm dia. × 28 cm high with sides slightly tapered to permit nesting when not in use. Constructed of polythene coated steel.
Each **£5. 6. 0.** *c*

DK-550

DK-580

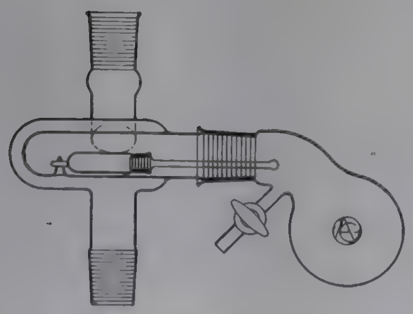
DK-600
DK-605

All items on this page normally available from stock.



DK-650

DK-655



DK-710

DK-650

DESICCATOR CABINET, glass in stainless steel frame with close fitting door. Fitted with glass shelves on three sides and a perforated stainless steel stand. Dimensions 25×30×25 cm high ... Each **£26. 0. 0.** *m*

DK-655

DESICCATOR CABINET, as DK-650, but with two compartments each with door, shelves and stand.
Each **£42. 0. 0.** *m*

DK-660

DESICCANT CAPSULE, silica gel, in perforated tin container. Suitable for use in balance cases and desiccator cabinets.

Dia.	41	63 mm	
Height	16	13 mm	
Suitable for air space	30	150 litres	
Dozen	**51/–**	**60/–**	*m*
Each	**5/8**	**6/4**	

DK-665

DESICCANT, silica gel, in 1 lb tins.
Dozen tins **£7. 0. 0.** Tin **£0. 12. 9.** c

DK-710

DESICCATOR, SEMI-MICRO, Ⓐ, **constant temperature vacuum pistol pattern,** for drying temperature sensitive substances in the presence of a drying agent. The drying chamber, which is surrounded by a vapour jacket, contains the weighing pig which is fitted with a loop and long-handled stopper so that the pig can be hooked on an ear in the drying chamber and opened or closed while in position. The drying agent flask with stopcock for vacuum control is connected by means of a 29/32 joint, and the vapour jacket has 29/32 joints for assembling with the requisite boiling flask and condenser.
Each **£4. 11. 0.** *a*

REPLACEMENT PARTS

DK-712	**Main glass part**	Each	**£2. 9. 0.**	*a*
DK-714	**Drying agent flask**	Each	**£1. 4. 0.**	*a*
DK-716	**Weighing pig,** for boats up to 33 mm long. Inside dia. 8–9 mm with ring at closed end, two feet and long handled ground-in stopper	Each	**£0. 18. 0.**	*a*

ACCESSORIES

FJ-110	**Flask,** flat bottom, 350 ml, 29/32 socket ...	For prices see entries in List No. sequence.
CU-520	**Condenser,** Davies double surface, 15 cm, cone 29/32	
Q-SB29	**Stopper,** cone 29/32, for closure of drying agent holder when not in use	

MK-146

MICRO DESICCATOR. For details see entry in List No. sequence.

All items on this page normally available from stock.

Gallenkamp VACUUM DRYING APPARATUS

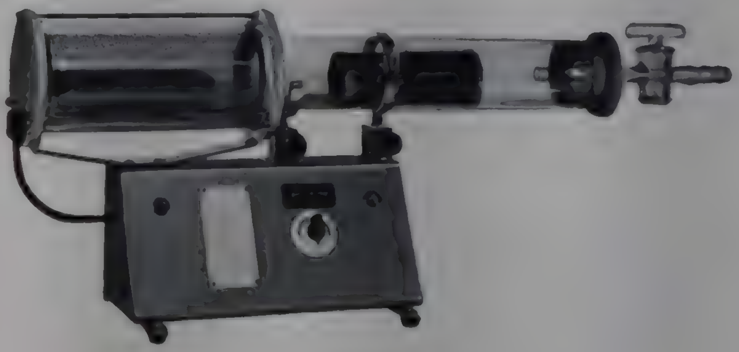
For heating materials, under vacuum and in the presence of a drying agent, in the range 50 to 150°C. By substituting an electric heater for the vapour jacket of the conventional apparatus, greatly increased convenience and safety are achieved.

DESCRIPTION

The heater is a borosilicate glass tube wound with nickel chromium wire. This is supported by a power unit which contains an energy regulator with a graduated scale. A plastics covered chart fitted to the unit provides a convenient means of recording dial settings for various temperatures, which are indicated by a mercury thermometer placed inside the drying tube. This combined heater and power assembly accepts both the drying tubes described below.

The borosilicate glass **general purpose drying tube** 75 mm dia., 50 cm long, and fitted with a rubber stopper with stopcock, clamps with its closed end within the heater. A stainless steel boat holds about 100 g of sample in the heated end and a monel gauze cylinder with a removable end cap is provided for containing solid desiccant such as silica gel in the unheated end.

Also available is the borosilicate glass **micro drying tube** 40 mm dia., 60 cm long, with a 40/38 cap at each end and a sidearm with double bore stopcock for evacuating and admitting air. A small sample is placed in the heated end and a glass boat containing a suitable desiccant such as phosphorus pentoxide is inserted in the unheated end.



DK-720

DK-720

VACUUM DRYING APPARATUS, GENERAL PURPOSE, *Gallenkamp*, as specification, for 220/240V a.c. single phase supplies, with drying tube and sample boat, but **without thermometer.** Each **£42. 10. 0.** *b*

REPLACEMENT PARTS

DK-722	**General purpose drying tube** ...	Each	**£1. 14. 0.**	*a*
DK-723	**Sample boat,** stainless steel ...	Each	**£1. 9. 6.**	*b*
DK-724	**Stopcock,** borosilicate glass ...	Each	**£2. 12. 0.**	*a*
DK-732	**Heater tube**	For prices see entries in List No. sequence below.		
DK-734	**Heater jacket**			

DK-725

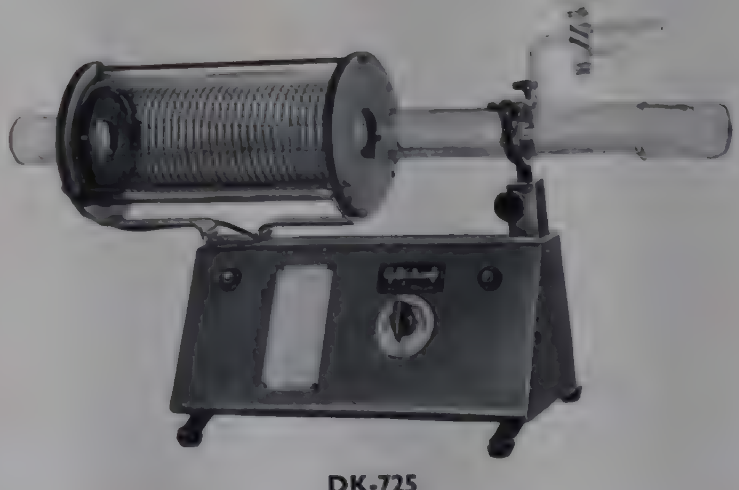
VACUUM DRYING APPARATUS, MICRO, *Gallenkamp*, as specification, for 220/240V a.c. single phase supplies, with drying tube and glass boat but **without thermometer** ... ... Each **£36. 0. 0.** *b*

REPLACEMENT PARTS

DK-727	**Micro drying tube** with stopcock, and 40/38 end cones.	Each	**£4. 2. 0.**	*a*
DK-728	**End cap,** 40/38 socket	Each	**£0. 17. 0.**	*a*
DK-729	**Desiccant boat,** glass	Each	**£0. 14. 6.**	*a*
DK-732	**Heater tube,** wound with nickel-chromium heating element. ...	Each	**£3. 16. 0.**	*b*
DK-734	**Heater jacket**	Each	**£2. 3. 0.**	*a*

ACCESSORIES

VB-882	**Apiezon grease**	For prices see entries in List No. sequence.
DK-665	**Desiccant,** silica gel	



DK-725

All items on this page normally available from stock.

DESKS see FURNITURE
DETERGENTS see CLEANING MATERIALS
DIAMONDS, cutting and writing see GLASSBLOWERS' TOOLS
DIGESTION, Kjeldahl see NITROGEN DETERMINATION
DILUTION PIPETTES see MEDICAL SCIENCES

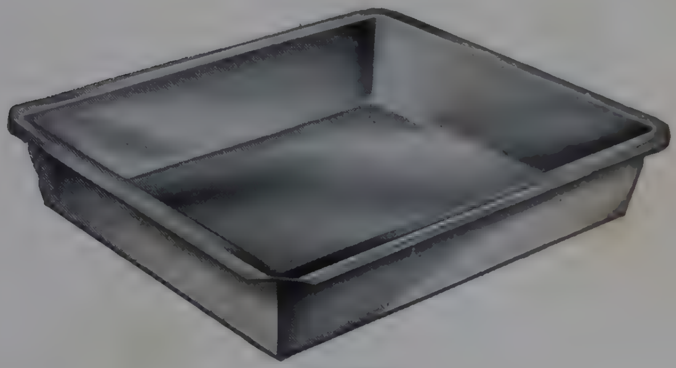
DIALYSIS

***DL-620**

DIALYSIS TUBING, *Visking*, transparent, seamless, viscose cellulose. Thickness 0·0125 inches.

Inflated dia.	19	28	70 mm	
Length	100	100	50 ft	
Per length	**£1. 18. 0.**	**£1. 18. 0.**	**£5. 4. 0.**	*m*

DISHES



DM-240

DM-240

DISHES, photographic developing, stainless steel, 5·5 cm deep.

For plate	10× 8 25×20	12×10 30×25	15×12 in 38×30 cm	
Each	**68/–**	**76/–**	**86/–**	c

DM-250

DISHES, photographic developing, high impact polystyrene, 5·5 cm deep.

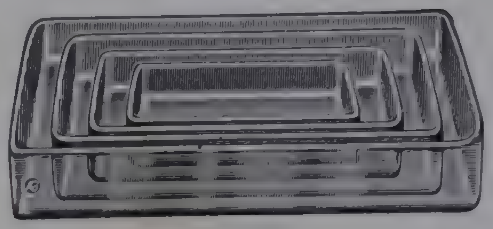
For plate	10× 8 25×20	12×10 30×25	15×12 in 38×30 cm	
Dozen	**70/–**	**130/–**	**175/–**	*m*
Each	**7/–**	**11/9**	**16/–**	

DM-260

DM-260

DISHES, dissecting, aluminium, seamless, with smooth flat flange. Height 5·7 cm.

Dimensions	34×23·5	40×33 cm	
Each	**£0. 19. 6.**	**£1. 5. 0.**	c

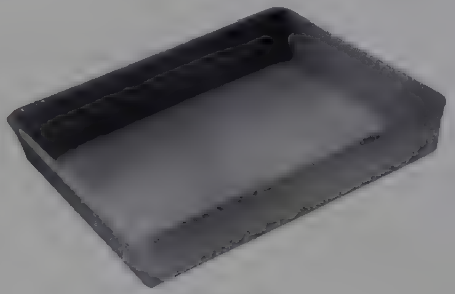


DM-265

DM-265

DISHES, dissecting, glass, with polished edges.

Length	20	25	30	37 cm	
Width	10	15	20	22 cm	
Height	5	5	5	7 cm	
Each	**14/–**	**22/6**	**34/–**	**58/–**	c

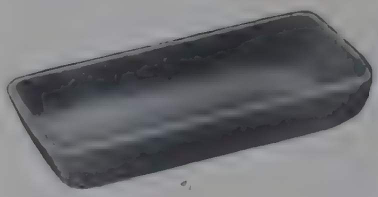


DM-270

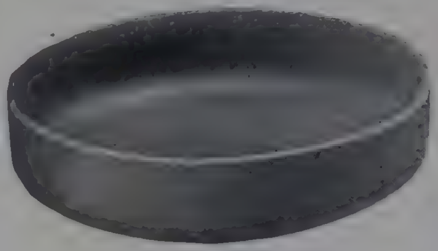
DM-270

DISH, polypropylene, rectangular shape with tapered sides. Suitable for use as an instrument tray. Nominal internal dimensions 30×25×5 cm deep.

Dozen **£7. 10. 0.** Each **£0. 13. 6.** c



DM-280



DM-285

DM-280

DISHES (ignition capsules), *Vitreosil*, glazed translucent silica, rectangular.

No.	1	2	3	
Dimensions	61×28×12	52×42×18	63×39×12 mm	
Ten	**118/–**	**118/–**	**144/–**	*m*
Each	**13/1**	**13/1**	**16/2**	

DM-285

DISHES (ignition capsules), *Vitreosil*, glazed translucent silica, circular, deep form. Height 28 mm.

Capacity	45	50	80	100 ml	
Dia.	56	62	75	87 mm	
Ten	**144/–**	**144/–**	**175/–**	**197/–**	*m*
Each	**16/2**	**16/2**	**19/5**	**21/11**	

DM-290

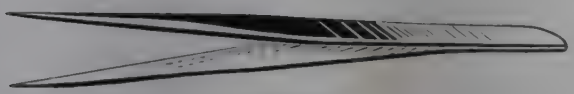
DISHES (ignition capsules), *Vitreosil*, as DM-285 but shallow form. Height 15 mm, except largest which is 18 mm high.

Capacity	10	15	20	30	35	50 ml	
Dia.	39·5	48	54	62	69	78 mm	
Ten	**74/–**	**74/–**	**102/–**	**112/–**	**118/–**	**144/–**	*m*
Each	**8/3**	**8/3**	**11/5**	**12/5**	**13/1**	**16/2**	

DISHES, crystallising } see BASINS
DISHES, moisture in coal } see BASINS
DISHES, Petri see CULTURE APPARATUS
DISHES, staining see HISTOLOGY

All items on this page normally available from stock.

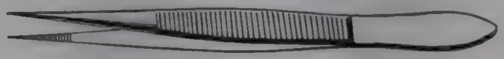
DISSECTING EQUIPMENT



DR-010

DR-010

FORCEPS, Boley pattern, nickel plated steel with fine points. Overall length 12·5 cm.
Dozen **£2. 12. 0.** Each **£0. 5. 8.** c



DR-020, DR-022

***DR-020**

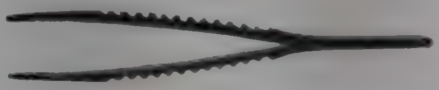
FORCEPS, nickel plated steel, straight with guide pin and fine points.

Length	11.5	12·5	15 cm	
Dozen	**66/–**	**68/–**	**100/–**	c
Each	**6/8**	**6/10**	**9/3**	

DR-022

FORCEPS, as DR-020 but stainless steel.

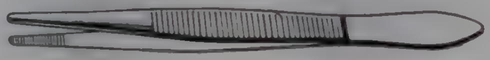
Length	11·5	12·5	15 cm	
Dozen	**135/–**	**135/–**	**200/–**	c
Each	**12/3**	**12/3**	**18/–**	



DR-029

DR-029

FORCEPS, reinforced black nylon, with corrugated blunt points, length 12·5 cm. These forceps have excellent mechanical strength and will withstand autoclave or dry heat sterilisation.
Pack of 50 **£3. 6. 6.** Dozen **£0. 15. 6.** Each **£0. 3. 0.** c



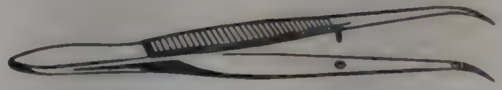
DR-030, DR-032

***DR-030**

FORCEPS, nickel plated steel, straight with guide pin and blunt points, 12·5 cm long.
Dozen **£3. 8. 0.** Each **£0. 6. 10.** c

DR-032

FORCEPS, as DR-030 but stainless steel.
Dozen **£6. 15. 0.** Each **£0. 12. 3.** c



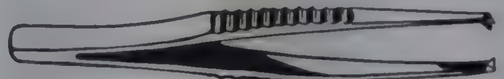
DR-040, DR-042

***DR-040**

FORCEPS, nickel plated steel, curved with guide pin and fine points, 12·5 cm long.
Dozen **£4. 0. 0.** Each **£0. 7. 10.** c

DR-042

FORCEPS, as DR-040 but stainless steel.
Dozen **£8. 0. 0.** Each **£0. 14. 6.** c



DR-050

DR-050

FORCEPS, Treve's rat tooth, stainless steel, 12·5 cm long ... ... Dozen **£13. 5. 0.** Each **£1. 4. 0.** c

HJ-550

FORCEPS, microscope slide, with spatulate ends. For price and details see entry in List No. sequence.

DR-100

DR-100

KNIFE, CARTILAGE, carbon steel, with 8·3 cm blade.
Dozen **£35. 0. 0.** Each **£3. 4. 0.** c

DR-150

DR-150

NEEDLE, all stainless steel. Length of needle 35 mm.
Dozen **£1. 16. 0.** Each **£0. 4. 6.** c

DR-155

NEEDLE, stainless steel, with cedarwood handle. Length of needle 35 mm ... ... Pack of 10 **£0. 4. 0.** c

DR-160

NEEDLE, with lancet point, 45 mm long, 5 mm wide, with hardwood handle with brass ferrule.
Dozen **£3. 10. 0.** Each **£0. 7. 0.** c

DR-220, DR-230

***DR-220**

SCALPELS, carbon steel blade and handle.

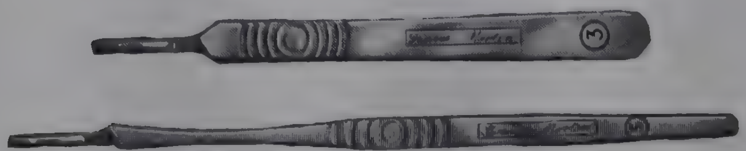
Length of blade	3·2	3·8	4·5	4·8	5·4 cm	
Dozen	**66/–**	**66/–**	**66/–**	**66/–**	**66/–**	c
Each	**6/8**	**6/8**	**6/8**	**6/8**	**6/8**	

DR-230

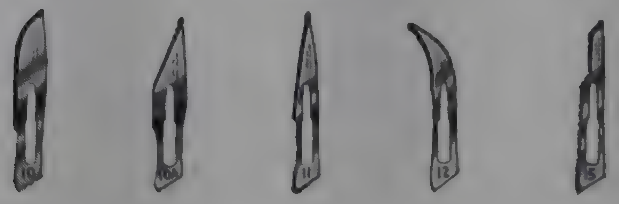
SCALPELS, stainless steel blade and handle.

Length of blade	3·2	3·8	4·5	4·8	5·4 cm	
Dozen	**130/–**	**130/–**	**130/–**	**130/–**	**130/–**	c
Each	**11/9**	**11/9**	**11/9**	**11/9**	**11/9**	

All items on this page normally available from stock.



DR-250



Blade No. 10 10A 11 12 15

DR-252

DR-250

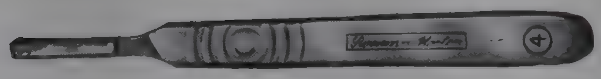
SCALPEL BLADE HOLDERS, for small size blades, DR-252.

Holder No.	3	5	
Length of handle	10	14 cm	
Dozen	**44/–**	**44/–**	*m*
Each	**5/–**	**5/–**	

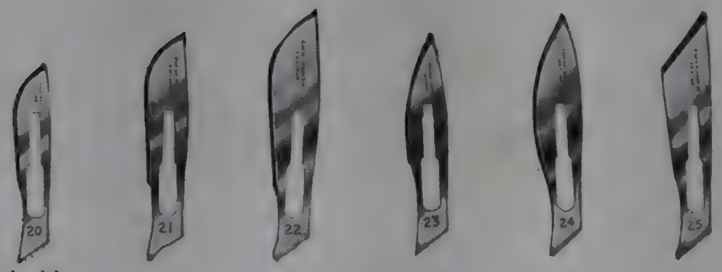
DR-252

SCALPEL BLADES, stainless steel, for holders DR-250, individually packed in sterile peel-open foil pockets, 36 pockets in a colour coded pack. The lengths quoted are those of the actual cutting edge.

Blade No.	10	10A	11	12	15	
Length approx.	25	17	15	15	11 mm	
Pack of 36	**14/6**	**14/6**	**14/6**	**14/6**	**14/6**	*m*
Dozen	**6/–**	**6/–**	**6/–**	**6/–**	**6/–**	



DR-260



Blade No. 20 21 22 23 24 25

DR-262

DR-260

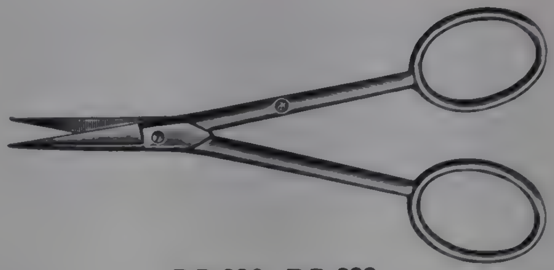
SCALPEL BLADE HOLDERS No. 4, for large size blades DR-262.

Dozen **£2. 4. 0.** Each **£0. 5. 0.** *m*

DR-262

SCALPEL BLADES, stainless steel, for holder DR-260, individually packed in sterile peel-open foil pockets, 36 pockets in a colour coded pack. The lengths quoted are those of the actual cutting edge.

Blade No.	20	21	22	23	24	25	
Length approx.	25	30	40	30	35	15 mm	
Pack of 36	**14/6**	**14/6**	**14/6**	**14/6**	**14/6**	**14/6**	*m*
Dozen	**6/–**	**6/–**	**6/–**	**6/–**	**6/–**	**6/–**	



DR-320, DR-322

***DR-320**

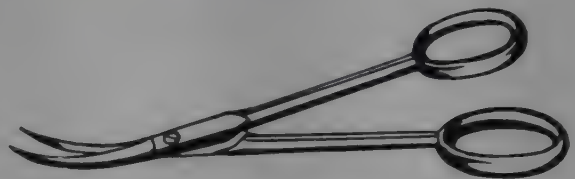
SCISSORS, nickel plated steel, open shanks, straight with fine points.

Length	11·5	12·5	15 cm	
Dozen	**76/–**	**88/–**	**135/–**	c
Each	**7/6**	**8/3**	**12/3**	

DR-322

SCISSORS, as DR-320 but stainless steel.

Length	11·5	12·5	15 cm	
Dozen	**155/–**	**175/–**	**270/–**	*m*
Each	**14/–**	**16/–**	**24/6**	



DR-330, DR-332

***DR-330**

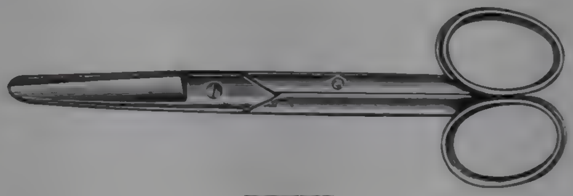
SCISSORS, nickel plated steel, open shanks, curved with fine points.

Length	11·5	12·5 cm	
Dozen	**88/–**	**118/–**	c
Each	**8/3**	**10/9**	

DR-332

SCISSORS, as DR-330 but stainless steel.

Length	11·5	12·5 cm	
Dozen	**175/–**	**235/–**	*m*
Each	**16/–**	**21/6**	



DR-340

***DR-340**

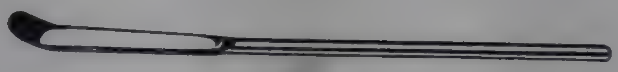
SCISSORS, nickel plated steel, closed shanks, straight with blunt points.

Length	12·5	15 cm	
Dozen	**90/–**	**130/–**	c
Each	**8/6**	**11/9**	

DR-342

SCISSORS, as DR-340 but stainless steel.

Length	12·5	15 cm	
Dozen	**180/–**	**265/–**	*m*
Each	**16/6**	**24/–**	



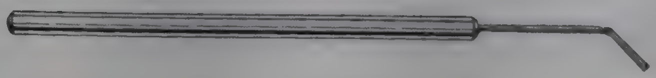
DR-400

DR-400

SECTION LIFTER, stainless steel. Length of blade 55 mm.

Dozen **£1.17. 0.** Each **£0. 4. 6.** c

All items on this page normally available from stock.



DR-460

DR-460

SEEKER, all stainless steel. Length of probe 40 mm.
Dozen **£1.18. 0.** Each **£0. 4. 7.** c

DR-470

SEEKER, stainless steel probe, with cedarwood handle.
Length of probe 35 mm ... Pack of 10 **£0. 4. 0.** c

DR-500

DR-500

SECTION RAZOR, carbon steel, with one flat surface.
Length of blade 75 mm.
Dozen **£8. 10. 0.** Each **£0. 15. 6.** c

DR-525

DR-525

DISSECTING AWL, with stainless steel spike, in milled brass handle. Length of spike 48 mm.
Dozen **£0. 9. 6.** Each **£0. 2. 6.** c

Details of other equipment used for dissection will be found under the following entries.

DM-260	**DISHES,** dissecting, aluminium.
DM-265	**DISHES,** dissecting, glass.
DM-270	**DISHES,** dissecting, polypropylene.
DR-570	**MICROSCOPE,** dissecting, *Olympus* see ADDENDA.
MA-795	**MAGNIFIER,** Falmer.
MA-805	**MAGNIFIER,** aspheric, plastics lens.
MA-900	**MAGNIFIER,** *Prior Stereomaster.*
ML-310 et seq.	**MICROSCOPES,** stereoscopic, *Olympus.*
MP-600 et seq.	**MICROMANIPULATORS,** *Prior.*
RJ-550	**FREEZER AEROSOL** for freezing specimens before dissection.

DR-550

DR-550

DISSECTING SET, STUDENT, in canvas roll with the following instruments.

DR-020/030	2 prs forceps, 12·5 cm
DR-155	2 needles
DR-220	3 scalpels (one each 3·8, 4·8 and 5·4 cm)
DR-320	1 pr scissors, 12·5 cm
DR-400	1 section lifter
DR-470	1 seeker

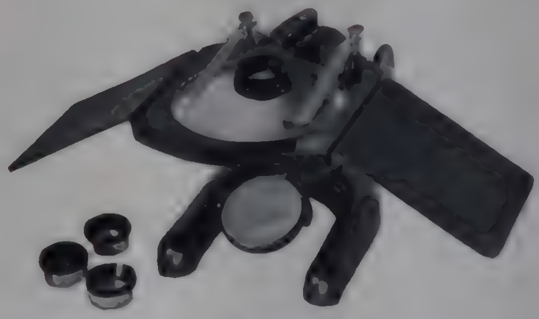
Complete set **£2. 12. 6.** c

DR-560

DISSECTING SET, in canvas roll, with the following instruments, all of stainless steel except DR-500.

DR-022/032/042	3 prs forceps, 12·5 cm
DR-150	2 needles
DR-230	4 scalpels (one each 3·8, 4·5, 4·8 and 5·4 cm)
DR-322	2 prs scissors (one each 11·5 and 12·5 cm)
DR-332	1 pr. scissors, 11·5 cm
DR-400	1 section lifter
DR-460	1 seeker
DR-500	1 section razor

Complete set **£8. 0. 0.** c



DR-580

DR-580

DISSECTING MICROSCOPE, *Prior,* with interchangeable ×5 and ×10 doublet lenses. A heavy horseshoe foot carries a vertical column upon which the rack and pinion focusing assembly and the working stage are mounted. The stage has a central clear glass disk either side of which arm rests are fitted. The magnifying lens is held by a double jointed arm enabling examination of any part of the glass stage to be made. Transmitted illumination is provided by a movable mirror with opal glass reverse face. ... ... Each **£17. 16. 0.** *fN*

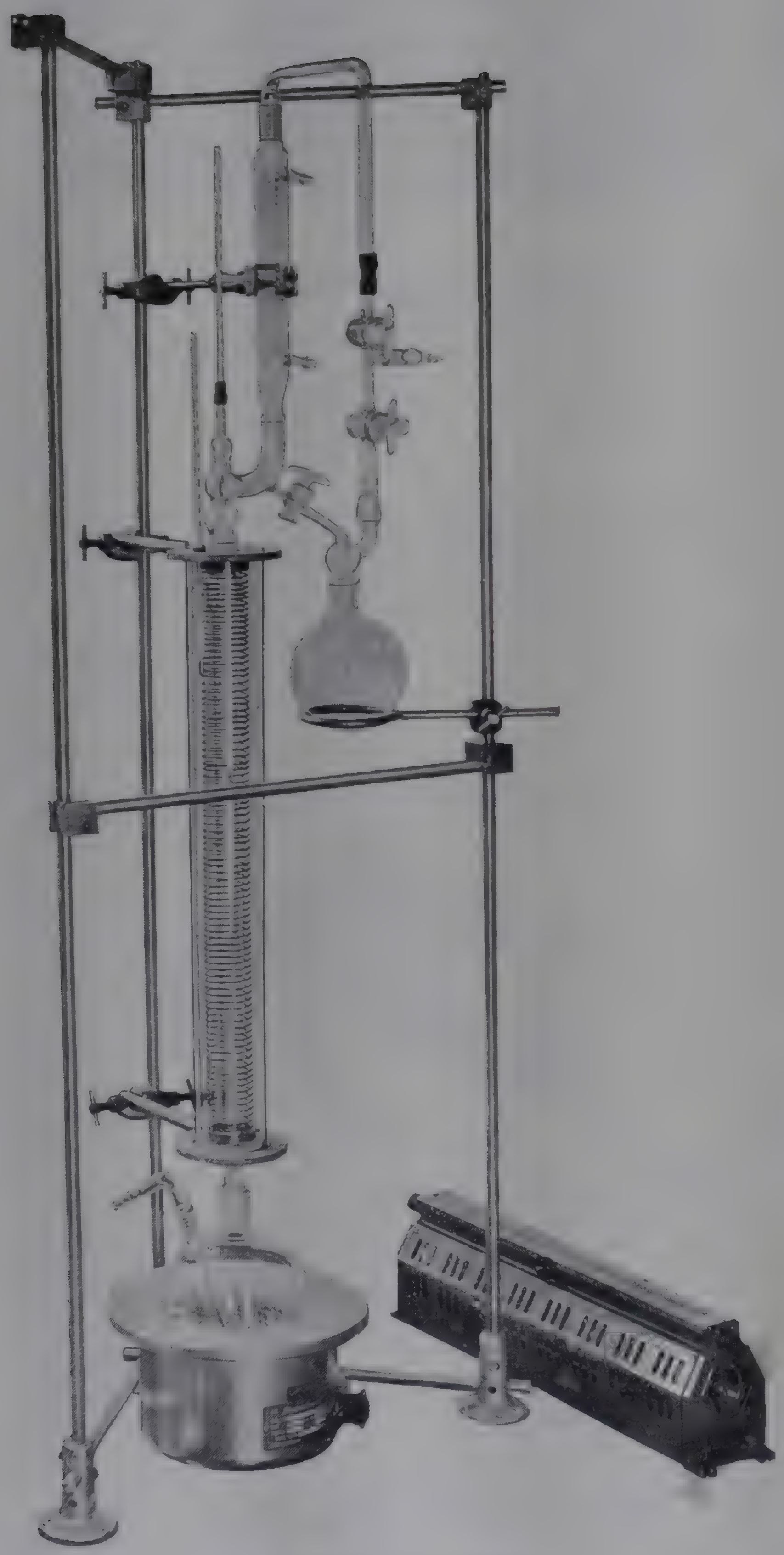
DR-585

DISSECTING MICROSCOPE, *Prior,* as DR-580 but fitted with **wide field** aplanatic lenses ×5 and ×10.
Each **£20. 10. 0.** *fN*

ACCESSORY
DR-588 Case, with lock and key ... ... Each **£3. 0. 0.** *fN*

Items on this page normally available from stock except those coded *N*.

Gallenkamp FRACTIONAL DISTILLATION UNIT



DT-520 with DT-538
and HD-500

A complete apparatus for the fractional distillation of liquids at atmospheric or reduced pressures.
Made of borosilicate glass, the apparatus is quickly and easily assembled, standard interchangeable joints being used throughout. The column has a high efficiency packing of single and multi-turn glass helices and has a high theoretical plate value of 12 to 15 plates (low HETP) with double-walled glass heater jacket wound with nickel-chromium tape, ensuring reasonably adiabatic conditions and permitting full view of the column during operations.
The stillhead DT-530 is of the simple total condensation type with variable take-off and reflux ratio control. At appropriate extra cost, stillhead DT-540 can be substituted.

DT-520

FRACTIONAL DISTILLATION UNIT, *Gallenkamp*, comprising glassware listed below, a rheostat for adjusting the temperature of the heating jacket, one each thermometers TJ-100 and TJ-102, range —5 to 360°C, tap grease, unreactive material for waxing joints when operating at high temperatures, and detailed instruction folder ... ... Each **£55. 10. 0.** *b*

ACCESSORY

HD-500	**Heating mantles.** For prices see entry in List No. sequence.		

REPLACEMENT PARTS

DT-524	**Air leak tube,** borosilicate glass, 14/23 cone.	Each **£0. 18. 6.**	*a*
DT-526	**Fractionating column,** borosilicate glass, 60 cm long, with 24/29 cone and socket ...	Each **£1. 17. 0.**	*a*
DT-528	**Support funnel** for column packing material.	Each **£0. 6. 9.**	*a*
DT-529	**Heater jacket,** borosilicate glass, double-walled, wound with nickel-chromium tape. Overall length 53 cm	Each **£7. 0. 0.**	*a*
DT-530	**Stillhead,** borosilicate glass, total condensation, variable take off pattern, with 24/29 cone ...	Each **£6. 10. 0.**	*a*
DT-536	**Calcium chloride tube,** borosilicate glass, with 14/23 socket	Each **£0. 17. 0.**	*a*
DT-537	**Connecting piece,** borosilicate glass, for vacuum distillation, with 19/26 cone and 14/23 socket, one 3-way and one 1-way tap and rubber junction.	Each **£6. 10. 0.**	*a*

DT-562	**Helices, Fenske,** single turn ... ...
DT-564	**Helices, Fenske,** multi-turn ... ...
Q-FR 500/3S/1A.	**Distillation flask.** borosilicate glass, 500 ml, with 24/29 central neck and 14/23 side neck ... ...
Q-FR 1L/3S/1A.	**Distillation flask,** as above but 1000 ml ... ...
Q-SB14	**Stopper,** borosilicate glass, 14/23 cone ...
Q-C 3/12.	**Condenser,** borosilicate glass, spiral pattern, with 19/26 cone and socket ...
TJ-100	**Thermometer,** range —5 to 360°C ...
TJ-102	**Thermometer,** range —5 to 360°C ...
TJ-325	**Thermometer adapter,** borosilicate glass, 14/23 cone, for TJ-102 ... ...
Q-FR 250/3S.	**Receiver flask,** borosilicate glass, 250 ml, with 24/29 neck ... ...
Q-FR 500/3S.	**Receiver flask,** as above but 500 ml.
Q-MF 23/2.	**Calcium chloride tube,** borosilicate glass, with 19/26 cone ... ...

For prices see entries in List No. sequence.

DT-538

LABLOX SET, *Gallenkamp*, to form a three-sided framework 122 cm high, suitable for above apparatus comprising:

SM-540	4 Rods, 15 in
SM-540	1 Rod, 18 in
SM-540	3 Rods, 48 in
SM-524	6 Connectors
SM-550	3 Circular feet
SM-562	9 Fixing screws
SM-600	1 Clamp
SM-610	4 Bossheads
SM-720	1 Retort stand ring, 8 cm

Set **£7. 0. 0.** *b*

All items on this page normally available from stock.

Gallenkamp STILLHEADS

DT-540

STILLHEAD, *Gallenkamp*, for use with DT-520 in place of DT-530. This is an efficient total condensation variable take-off stillhead embodying many desirable features and suitable for most general laboratory fractionating requirements. Made from borosilicate glass, the stillhead is simple to operate and easy to clean. The reflux ratio is controlled by a tapered metal rod which fits into a glass socket. The rod has a fine thread to adjust its position and extends through a vacuum seal. There is no risk of contamination of the distillate by grease. The liquid hold up is very small. The apparatus is suitable for use at atmospheric and reduced pressures. The standard model is fitted with a 24/29 cone to fit the column, a 14/23 cone for the take-off and a 14/23 socket for the thermometer adapter.
Each **£17. 0. 0.** *a*

DT-548

STILLHEADS, (AG) 30° pattern with 14/23 socket for thermometer and 19/26 cone for condenser. This steep angle stillhead provides good drainage for a Davies condenser (CU-550) and can also be used in Quickfit assemblies to provide a more compact apparatus.

Main cone	19/26	24/29	
Dozen	**170/-**	**185/-**	*a*
Each	**15/6**	**17/-**	

DT-555

STILLHEAD, (AG) small pattern for semi-micro preparation apparatus with condenser CU-452 and CU-454. Cone and socket 14/15 and thermometer sleeve.
Dozen **£5. 0. 0.** Each **£0. 9. 3.** *a*

SPLASH HEADS, see NR-200, NR-204 in List No. sequence.

COLUMN FILLINGS

DT-560

RINGS, Rashig, glass approx. 5 mm dia. × 5 mm long. In pack containing minimum of 250 g. Filling capacity approx. 300 ml.
Dozen packs **£8. 15. 0.** Pack **£0. 16. 0.** *a*

DT-562

HELICES, Fenske, single turn 4 mm dia. made from 0·5 mm dia. borosilicate glass rod. In bottle containing minimum of 50 g. Filling capacity approx. 100 ml.
Five bottles **£5. 0. 0.** Bottle **£1. 1. 0.** *m*

DT-564

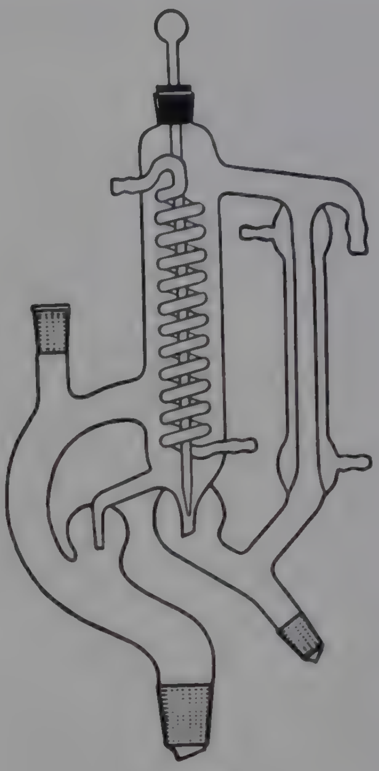
HELICES, Fenske, multi turn 4 mm dia. made from 0·5 mm dia. borosilicate glass rod. In bottle containing minimum of 50 g. Filling capacity approx. 150 ml.
Five bottles **£5. 15. 0.** Bottle **£1. 4. 0.** *m*

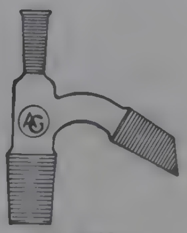
COLUMNS

DT-566

FRACTIONATING COLUMNS, (AG), **Young,** rod and disk pattern, **borosilicate glass.**

No. of disks	15	20	
Dozen	**265/-**	**330/-**	*a*
Each	**24/-**	**30/-**	


DT-540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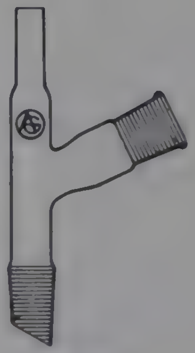
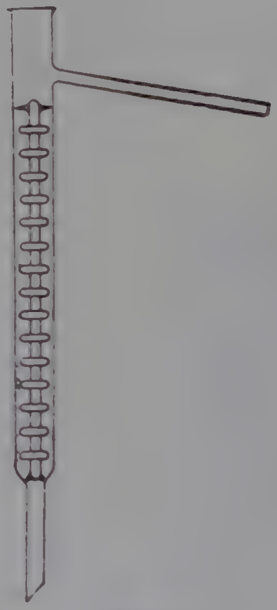
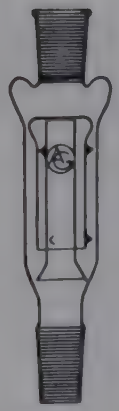
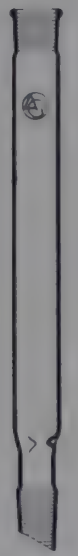

DT-555


DT-566


DT-568


DT-576

DT-568

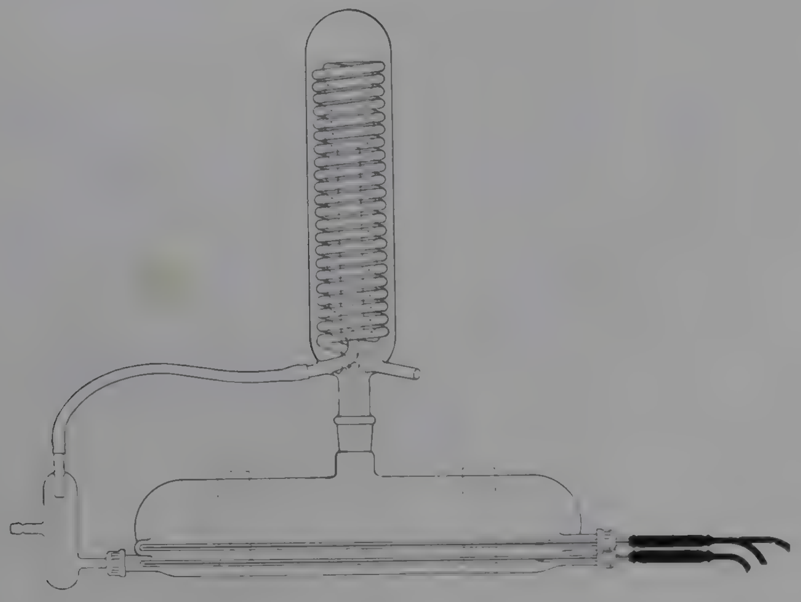
FRACTIONATING COLUMN, Young and Thomas pattern, (AG), **borosilicate glass,** consisting of single section with 19/26 cone and socket. Multi-section columns may be constructed as required ... Each **£1. 7. 0.** *a*

DT-576

FRACTIONATING COLUMN, (AG) with 14/15 socket and 14/15 drip end cone joints. Effective length 140 mm, internal dia. 14 mm with three indents at the lower end to support packing. Borosilicate glass. Approximate capacity for packing materials, 30 ml.
Dozen **£4. 8. 0.** Each **£0. 8. 3.** *a*

All items on this page normally available from stock.

QUICKFIT ALL-GLASS WATER STILL



DT-580

- Output approximately 4 litres/hour
- Distillate quality—1 to 2×10^6 ohms/cm^3
- Minimum cooling water usage and high efficiency achieved by returning condenser water to still body
- Preset constant level device
- Requires only 60×20 cm bench space
- Silica sheathed elements

DT-580

STILL, glass and ptfe, *Quickfit* **4WSG,** as specification, output approximately 4 litres/h of water having an average quality between 1 and 2×10^6 ohms/cm^3. Heating is by means of three independent 1 kW silica sheathed immersion elements giving a power consumption of approximately 0·75 kWh/litre of distillate. For 190/250V a.c. single phase supplies. Requires but does not include two support brackets DT-585 for wall or bench mounting.
Each **£29. 10. 0.** *m*

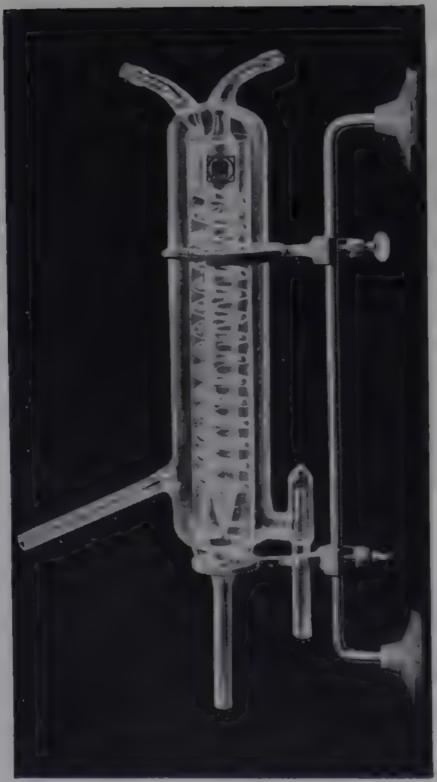
REPLACEMENT PART

DT-582 **Heater,** 1 kW silica sheathed. For 190/250V a.c. supplies.
Each **£4. 0. 0.** *m*

ACCESSORY

DT-585 **Support bracket,** nylon covered required for mounting still on bench or wall ... ... Pair **£2. 10. 0.** m

STRIP ACTION STILL



DT-590 with DT-592

DT-590

STILL, strip action, borosilicate glass, for producing distilled water from steam mains, output 4·5 litres/h. Steam enters at the bottom and is fractionated in the air-cooled outer jacket, the steam being stripped of dirt, oil, etc., by the descending water fraction. The clean steam passes over an efficient spiral water condenser and the distilled water emerges at the bottom, while the fraction containing the dirt leaves through a trap. If the mains steam is exceptionally clean, the air jacket can be lagged to reduce the proportion of steam fractionated out, and thus increase the distilled water output. The still cannot fur up, and since cold water does not have to be boiled, its thermal efficiency is high ... Each **£8. 18. 6.** *f*

In the U.K. this still is supplied packed in a returnable crate charged at £5 which is refunded on return in good condition.

ACCESSORY

DT-592 **Bracket,** for wall mounting ... Each **£3. 0. 0.** *f*

All items on this page normally available from stock.

MANESTY WATER STILLS

DT-602

DT-612
and
DT-616

List No.	Type	Output litres/h	Consumption/h	Height cm	Type of finish	Each	
DT-602	Destil electric	1·1	1 kW	54	Standard	£18. 10. 0.	f
DT-612	OB electric	1·7	1·5 kW	65	Standard	£27. 0. 0.	f
DT-613	OB electric	1·7	1·5 kW	65	Vitreous	£32. 0. 0.	f
DT-616	OOB electric	3·8 to 4·5	3 kW	75	Standard	£41. 0. 0.	f
DT-617	OOB electric	3·8 to 4·5	3 kW	75	Vitreous	£47. 0. 0.	f
DT-618	S30 electric	3·8 to 4·5	3 kW	66	Stainless steel	£75. 0. 0.	fN
DT-620	OOO steam	9	—	115	Standard	£65. 0. 0.	fN
DT-622	1B steam	18	—	105	Standard	£121. 0. 0.	fN
DT-624	2B steam	36	—	135	Standard	£144. 0. 0.	fN
DT-626	3B steam	90	—	210	Standard	£298. 0. 0.	fN

Electric models are available for 100/110, 200/210 or 220/240V supplies.
When ordering please state voltage and nature of supply.

All models of this range of automatic water stills for wall mounting have an identical method of operation. Water enters at the base of the condenser, circulates round the condenser tube and fills the boiling chamber to a height controlled by the overflow chamber. The water is pre-heated almost to boiling point by condensing steam before entering the boiling chamber, and dissolved gases are liberated and expelled.

DESTIL MODEL

This low capacity model incorporates a toughened glass inner baffle and a removable condenser tube fitted below the metal lid.

OB and OOB MODELS

These are medium capacity stills available in the standard finish of heat resisting aluminium paint or alternatively with an attractive, corrosion resisting finish where all cast iron parts are vitreous enamelled and the other external parts are chromium plated. Other parts are common and include a baffle cup, a lid of toughened glass, a condenser tube and an inner baffle of stainless steel.

S30 MODEL

The standard finish for this model is polished stainless steel, the boiling chamber, lid, baffle, condenser and nozzle all being made of this material. This model is not available for 100/110V except with a 1500W element producing half the output.

STEAM MODELS

These large capacity models will operate on steam pressures between 25 and 60 lb/in², though pressures of 30 to 40 lb/in² are ideal. Average consumption is 3 lb steam at 40 lb/in² for each 1 litre distilled water.

REPLACEMENT PARTS

DT-630	**Heating element,** 1000W, for DT-602, with safety device	Each £2. 6. 0.	f
DT-632	**Heating element,** 1500W, for DT-612 to DT-617, with safety device	Each £2. 6. 0.	f
	NOTE: Two elements, DT-632, required for stills DT-616 and DT-617. This same element is used in the 100/110V range for still DT-618.		
DT-634	**Heating element,** 3000W, for DT-618, when used on 200/210 or 220/240 volts, with safety device.	Each £4. 8. 6.	f

When ordering above elements please state voltage and nature of supply.

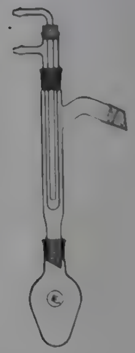
DT-640	**Baffle cup,** toughened glass, for DT-602 to DT-620, inclusive	Each £0. 5. 6.	f
DT-644	**Lid,** toughened glass, for DT-612 to DT-624, inclusive (except DT-618)	Each £1. 15. 0.	f

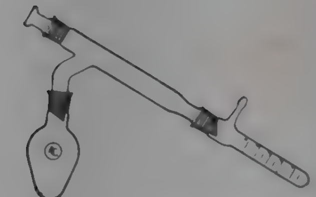
Items on this page normally available from stock except those coded *N*.

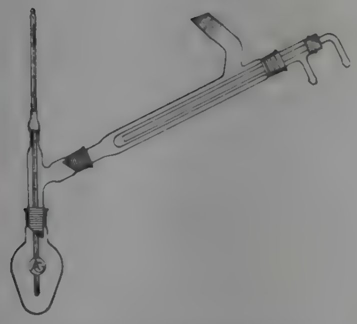
Regd.

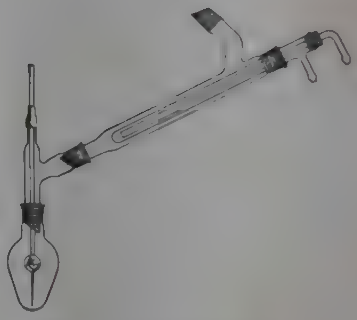
SMALL SCALE PREPARATIVE SETS

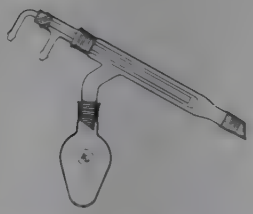
For Educational Purposes

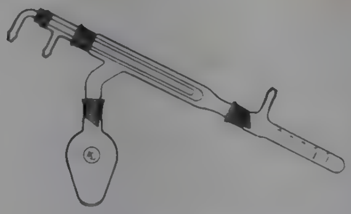

Reflux reaction

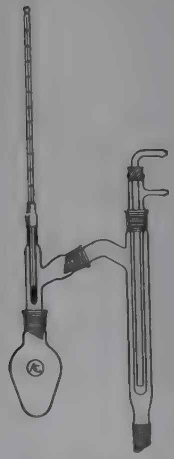

Distillation with air condenser (Stopper can be replaced by cork and thermometer if desired)

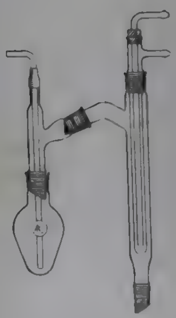

Reflux with thermometer in liquid or vapour

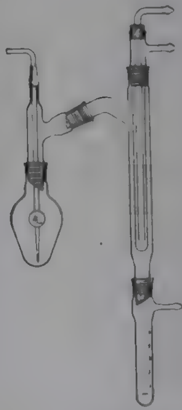

Reflux with inert gas stirring or gas reactant addition

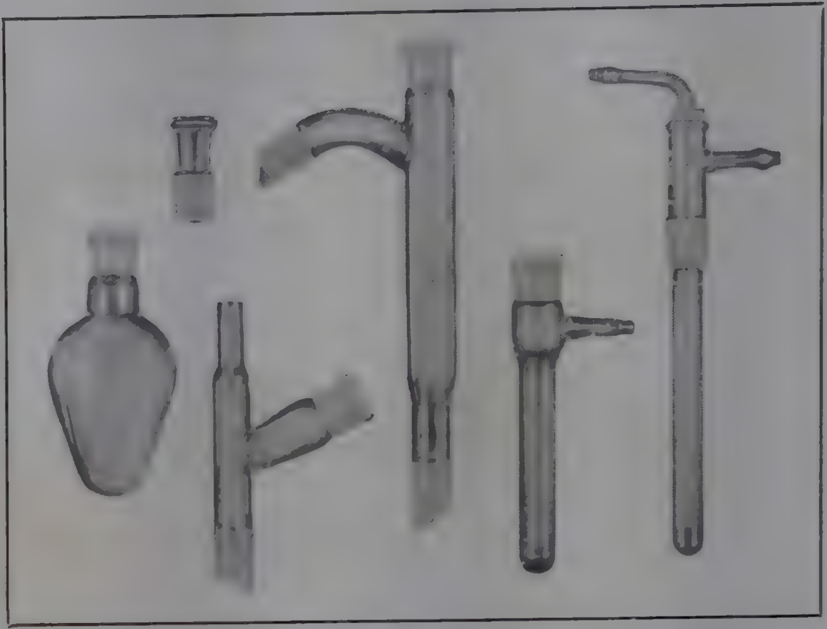

Distillation with water condenser


Vacuum distillation


Distillation with water condenser and thermometer


Steam distillation


Vacuum distillation with air leak



SMALL SCALE BASIC PREPARATIVE SET

A set for educational purposes comprising six simple components with which the basic preparative operations of organic chemistry can be performed.

- **Versatility**
  Permit a maximum number of assemblies for a minimum cost. All components have 14/15 ground joints.
  The assemblies are practically self supporting and require a minimum of clamping.
- **Economic**
  The small scale saves space, reduces time taken in setting up and reduces costs due to the smaller quantities of reagents required. This saving is most significant with expensive reagents.
- **Safe**
  Using smaller quantities of reagent, the set is safer to operate than larger scale glassware. Laboratory fume level is minimised.
- **Robust**
  The components are more robust than their macro equivalent, and generally outlast them.

COMPONENTS. The basic set contains one each of the following:

FJ-195	**Flask, pear shaped,** borosilicate glass. Socket 14/15. Capacity 30 ml.
DT-555	**Stillhead,** borosilicate glass. With plain thermometer tubulure, cone and socket 14/15.
CU-452	**Condenser, 'cold finger',** borosilicate glass. Cone 14/15.
CU-454	**Condenser jacket, with side arm,** borosilicate glass. Socket and two cones 14/15.
TF-420	**Receiver, graduated, with side arm,** borosilicate glass socket 14/15. Capacity 5 ml, subdivided in 0·5 ml.
SU-520	**Stopper,** borosilicate glass. Cone 14/15.

DT-750

SMALL SCALE BASIC PREPARATIVE SET, comprising six components listed. Packed between preformed plastics storage trays within stout carton.

Each in doz. lots **£2. 5. 0.** Each **£2. 9. 0.** *a*

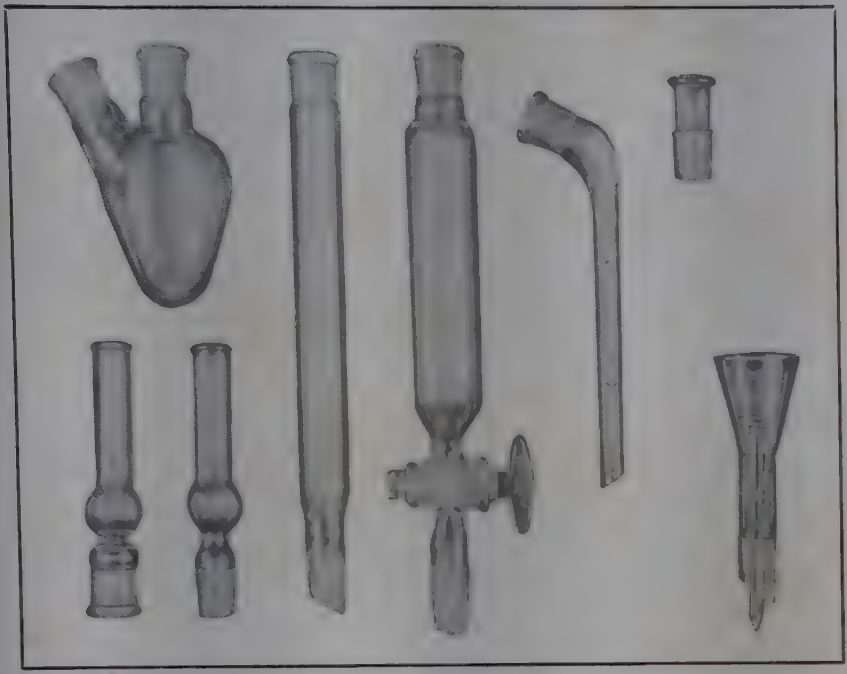
For details and prices of components see entries in List No. sequence.

All items on this page normally available from stock.

SMALL SCALE PREPARATIVE SETS

For Educational Purposes

Regd.



Ⓐ SMALL SCALE EXTENSION PREPARATIVE SET

A supplementary set which, together with the BASIC PREPARATIVE SET, enables the additional organic preparations required by some chemistry syllabuses to be performed quickly, easily and with the minimum of expense.

COMPONENTS. The extension set contains one each of the following:

FJ-196	**Flask,** pear shaped, two neck, sockets 14/15. Capacity 30 ml. Borosilicate glass.
FP-290	**Funnel,** Willstätter filter, with 14/15 cone. Capacity 5 ml. Borosilicate glass.
FP-587	**Funnel,** cylindrical dropping, with 14/15 cone and socket. Capacity 30 ml. Borosilicate glass.
AB-620	**Absorption tube** with 14/15 cone. Borosilicate glass.
AB-625	**Absorption tube** with 14/15 socket. Borosilicate glass.
CU-460	**Condenser adapter** with 14/15 socket. Borosilicate glass.
DT-576	**Fractionating column** with 14/15 cone and socket. Effective dimensions 140 mm × 15 mm dia. Borosilicate glass. Packing capacity approx. 30 ml.
SU-520	**Stopper.** Borosilicate glass. Cone 14/15.

DT-755

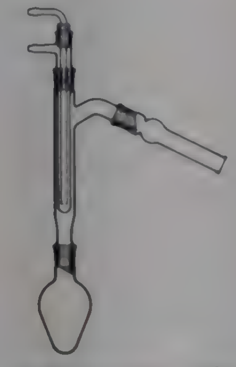
SMALL SCALE EXTENSION PREPARATIVE SET, Ⓐ, comprising eight components listed. Packed between preformed plastics storage trays within stout carton.

Each in doz. lots **£3. 10. 0.** Each **£3. 16. 0.** *a*

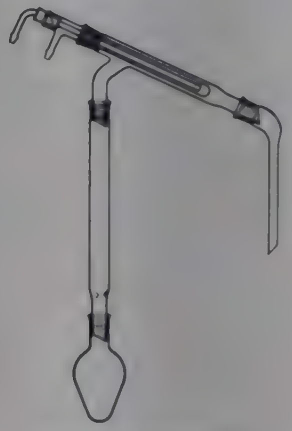
For details and prices of components see entries in List No. sequence.

ACCESSORIES

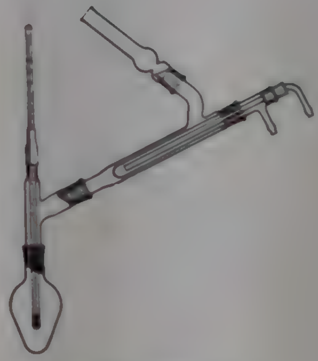
DT-758	**Glass balls,** 6 mm diameter, for packing fractionating columns. Polythene envelope containing approx. 30 ml. Each **£0. 2. 6.** *b*	
DT-240	**Rings, Raschig,** glass, for packing fractionating columns, approx. 5 mm	For prices see entries in List No. sequence.
FD-672	**Flasks,** conical, with 14/15 socket. Capacity 5, 10 and 25 ml	
SM-685	**Clamp,** adjustable, for supporting assemblies on a retort stand	
TJ-056	**Thermometer,** 150°C, length 15 cm ...	



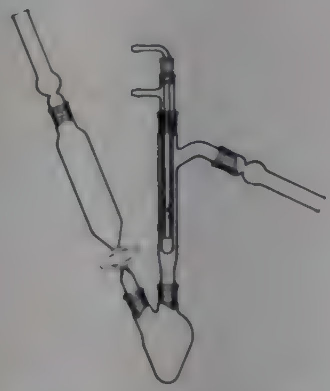
Reflux reaction under dry air



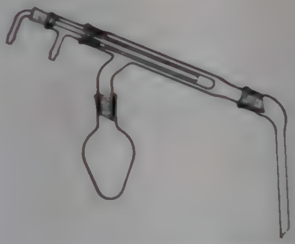
Fractional distillation



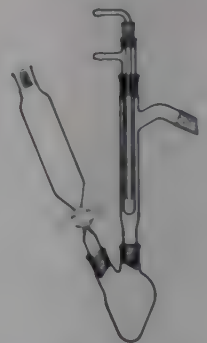
Reflux under dry air with thermometer in liquid or vapour



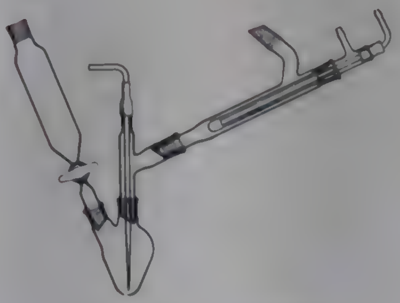
Reflux under dry air with addition of a water sensitive liquid reactant



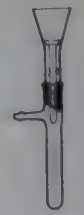
Distillation with water condenser and vertical delivery



Reflux with continuous addition of liquid reactant



Reflux with continuous addition of liquid and gaseous reactants

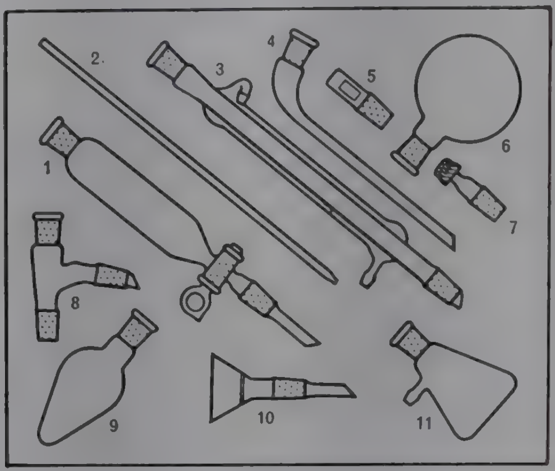


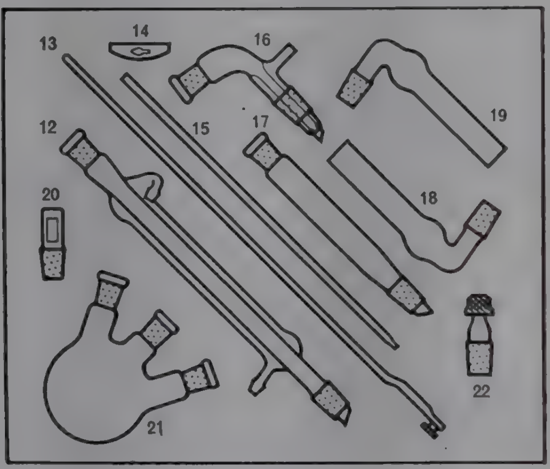
Suction filtration

All items on this page normally available from stock.

SETS OF QUICKFIT AND CLEARFIT APPARATUS

For Distillation and Preparative Chemistry





A series of *Quickfit* and *Clearfit* sets, made throughout from heat and chemical resistant borosilicate glass, has been designed to cover the requirements of practical organic chemistry in its many different fields. The sets range from gramme to kilogramme size and from the simplest set of five parts, for use in teaching establishments, to the comprehensive set suitable for the needs of an advanced research worker. The advantages of completely standardised parts are considerable from the standpoints both of versatility and economy, utilising the stock of apparatus fully, reducing initial cost and simplifying replacements.

Storage

Quickfit and *Clearfit* sets provide fitted trays to take all parts in a minimum of space. These will either fit into the usual laboratory bench drawer or cupboard or may be retained in their original box. Sizes of the trays are standardised and a number of them can be accommodated in a separate cabinet if desired.

Contents of sets

Great attention has been given to the design of the contents of each set so that it will cover the widest possible range of techniques, although keeping the number of different parts as low as possible. The larger sets provide extra numbers of items which are in almost constant use, such as flasks and stoppers; thus several pieces of apparatus can be operated at one time.

SUMMARY OF SETS

QUICKFIT SET 30 BU for preparative organic chemistry on quantities from 50 to 1500 ml (approx. 20 g to 1 kg) based on joint sizes 14/23, 19/26 and 24/29. This set can be built up progressively as follows:

DT-800	**Starting set 34BU**, to which may be added
DT-802	**Extension set 34X** which will then be equivalent to
DT-804	**Intermediate set 33BU**, to which may be added
DT-806	**Extension set 33X** which will then be equivalent to
DT-808	**Intermediate set 32BU**, to which may be added
DT-810	**Extension set 32X** which will then be equivalent to
DT-812	**Set 30BU**

QUICKFIT SET 23 BU for preparative organic chemistry on quantities up to 50 ml (approx. 30 g) based on joint size 14/23. This set can be built up in stages as follows:

DT-830	**Starting set 29BU**, to which may be added
DT-832	**Extension set 29X** which will then be equivalent to
DT-834	**Intermediate set 27BU**, to which may be added
DT-836	**Extension set 27X** which will then be equivalent to
DT-838	**Set 23BU**

QUICKFIT SEMI-MICRO LABORATORY 10 BU. A self-contained portable miniature laboratory for organic chemistry based on joint size 10/19. It is supplied complete with supporting stand and although primarily designed for educational purposes, has found use in many industrial organic laboratories.

DT-870	**Miniature laboratory 10BU**

CLEARFIT ONE-JOINT SETS. Two versatile sets of apparatus fitted with the new *Clearfit* joints and suitable for general organic chemistry. Set KA2/11 has 19/26 joints and includes flasks from 50 to 500 ml. Set KA4/11 has 29/32 joints and flasks from 100 to 1000 ml.

DT-900	***Clearfit* Set KA2/11**
DT-920	***Clearfit* Set KA4/11**

QUICKFIT SETS

For Distillation and Preparative Chemistry

STARTING AND INTERMEDIATE SETS FOR SET 30 BU for quantities from 30 g to 1 kg.

DT-800

QUICKFIT SET 34 BU. A starting set of 16 components which include the necessary equipment for a wide range of preparations up to 150 g scale. Complete in cardboard box with plastics storage tray 48 × 38 × 11 cm.

Each **£10. 17. 0.** Each (per two off) **£9. 15. 3.** *m*

DT-802

QUICKFIT SET 34 X. An extension set of 10 components which convert 34 BU into 33 BU. Box 48 × 38 × 18 cm.

Each **£9. 7. 6.** Each (per ½ doz.) **£8. 8. 9.** *m*

DT-804

QUICKFIT SET 33 BU. Intermediate set of 26 components of wider scope than 34 BU up to 300 g scale and provides for stirring and steam distillation. In two boxes as detailed above.

Each **£20. 4. 6.** Each (per two off) **£18. 4. 0.** *m*

DT-806

QUICKFIT SET 33 X. An extension set of 20 components which convert 33 BU into 32 BU. In two boxes 46 × 38 × 11 cm and 18 cm respectively.

Each **£24. 15. 6.** Each (per two off) **£22. 6. 0.** *m*

DT-808

QUICKFIT SET 32 BU. Intermediate set of 46 components providing a comprehensive range of equipment for organic chemistry up to 1 kg scale. Includes 3 neck flasks, fractionating column, double surface condenser and ground sleeve stirrer. In four boxes as detailed above.

Each **£45. 0. 0.** Each (per two off) **£40. 10. 0.** *m*

DT-810

QUICKFIT SET 32 X. An extension set of 53 components which convert 32 BU into 30 BU. In five boxes, three of them 46 × 38 × 11 cm, 11 cm and 18 cm respectively and two 38 × 23 × 7 cm.

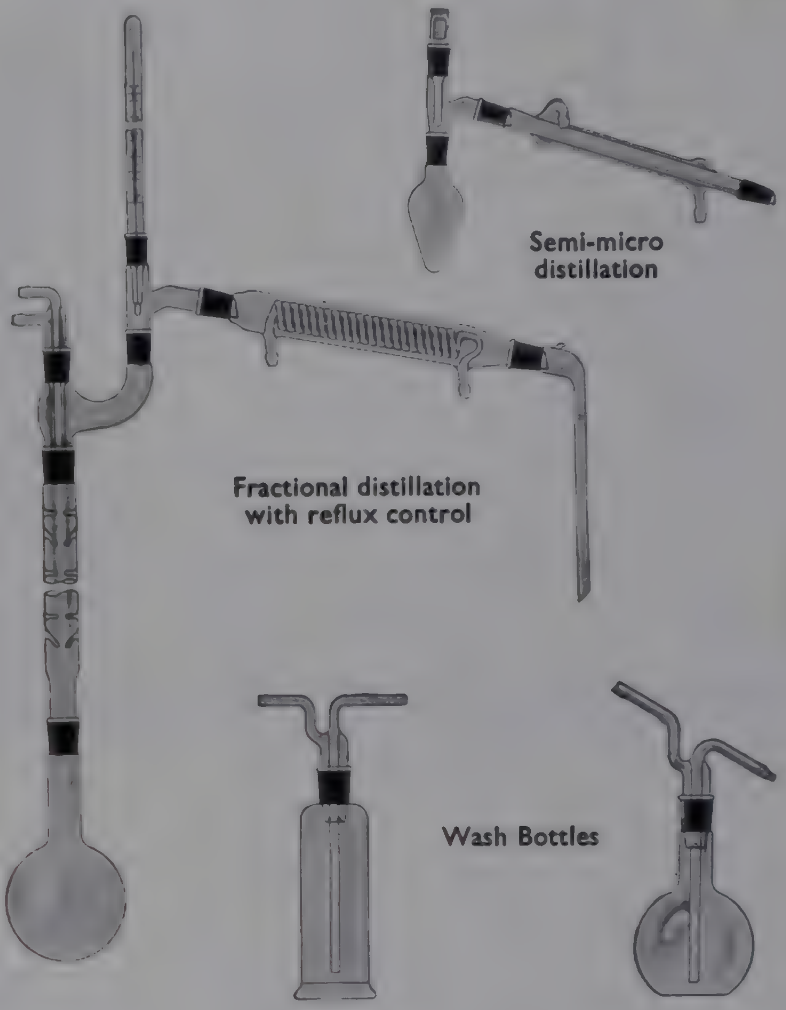
Each **£50. 10. 0.** Each (per two off) **£45. 9. 0.** *m*

DT-812

QUICKFIT SET 30 BU. A comprehensive multi-joint set of 99 components with which a very wide range of organic reactions and preparations can be carried out on any scale from 30 g to 1 kg. In nine boxes as detailed above.

Each **£95. 10. 0.** Each (per two off) **£85. 19. 0.** *m*

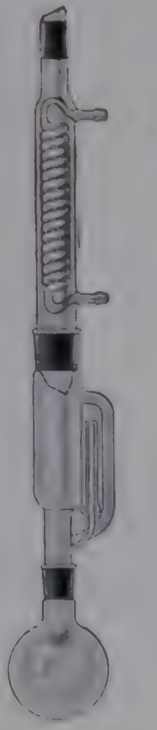
For details and prices of replacement components see listing under **QUICKFIT APPARATUS.**



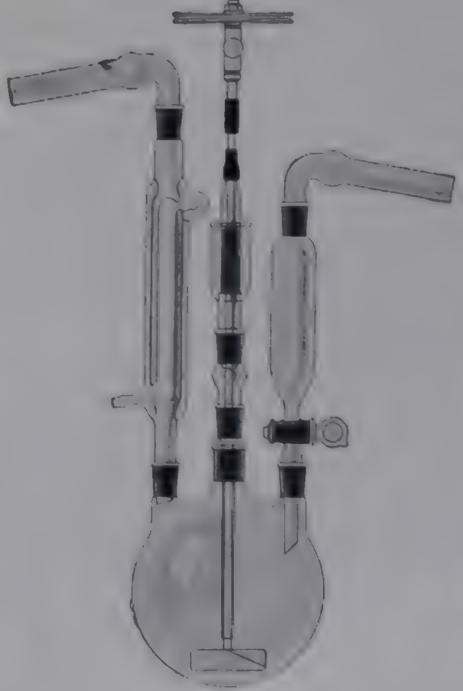
Semi-micro distillation

Fractional distillation with reflux control

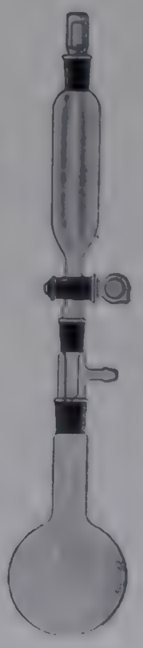
Wash Bottles



Extraction



Reflux with stirring and addition of reactants

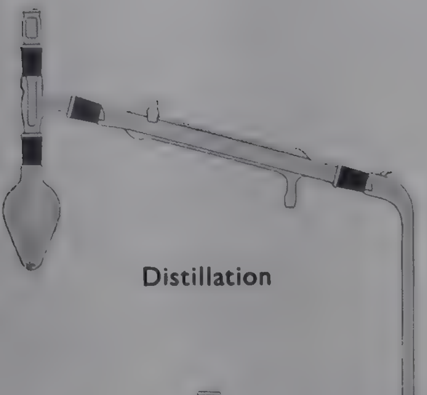


Gas evolution

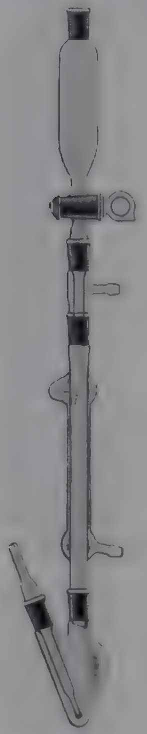
All items on this page normally available from stock.

QUICKFIT SETS

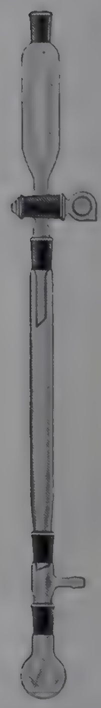
For Distillation and Preparative Chemistry



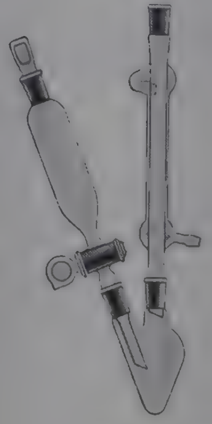
Distillation



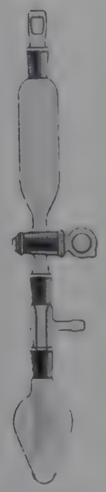
Reflux with gas and liquid inlets



Chromatography



Reflux with liquid addition



Gas evolution

14/23 ONE JOINT SETS

DT-830

QUICKFIT SET 29 BU. A basic set of 5 components with 14/23 joints designed for elementary organic chemistry in schools on a 30 g scale. In cardboard box 30×18×12 cm.
Each **£3. 6. 9.** Each (per ½ doz.) **£3. 0. 0.** *m*

DT-832

QUICKFIT SET 29 X. An extension set of 3 components which convert 29 BU into 27 BU. In cardboard box. Each **£2. 15. 6.** Each (per ½ doz.) **£2. 10. 0.** *m*

DT-834

QUICKFIT SET 27 BU. An intermediate set of 8 components with 14/23 joints for student use. Box 38×23×7 cm. Each **£5. 17. 6.** Each (per ½ doz.) **£5. 5. 9.** *m*

DT-836

QUICKFIT SET 27 X. An extension set of 8 components which convert 27 BU into 23 BU. Box 38×23×7 cm. Each **£4. 7. 0.** Each (per ½ doz.) **£3. 18. 3.** *m*

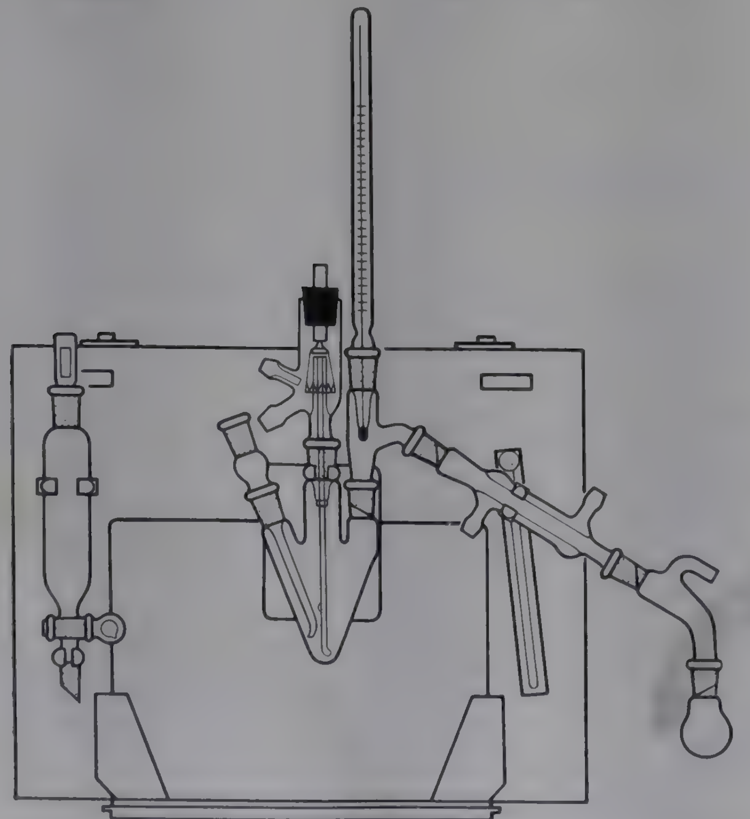
DT-838

QUICKFIT SET 23 BU. An advanced students set of 15 components with 14/23 joints and a plastics drawing stencil. For small scale preparations up to 30 g scale. In two boxes each 38×23×7 cm.
Each **£10. 4. 6.** Each (per ½ doz.) **£9. 4. 0.** *m*

SEMI-MICRO LABORATORY

DT-870

QUICKFIT PORTABLE LABORATORY 10 BU. Comprising 22 components with 10/19 joints and a plastics drawing stencil complete in dual purpose box 28×23×7 cm. The lower part of the box serves for storage of components while the two-piece lid easily converts to a stand on which assemblies can be mounted in plastics coated spring clips. The working surface is plastics coated and a flame deflector is fitted. More than 25 assemblies can be used which will cover organic chemistry up to degree level for educational purposes. The laboratory has also proved popular in many industrial laboratories on account of economy in initial cost, in space and in reagents.
Each **£20. 15. 0.** Each (per two off) **£18. 13. 6.** *m*



DT-870

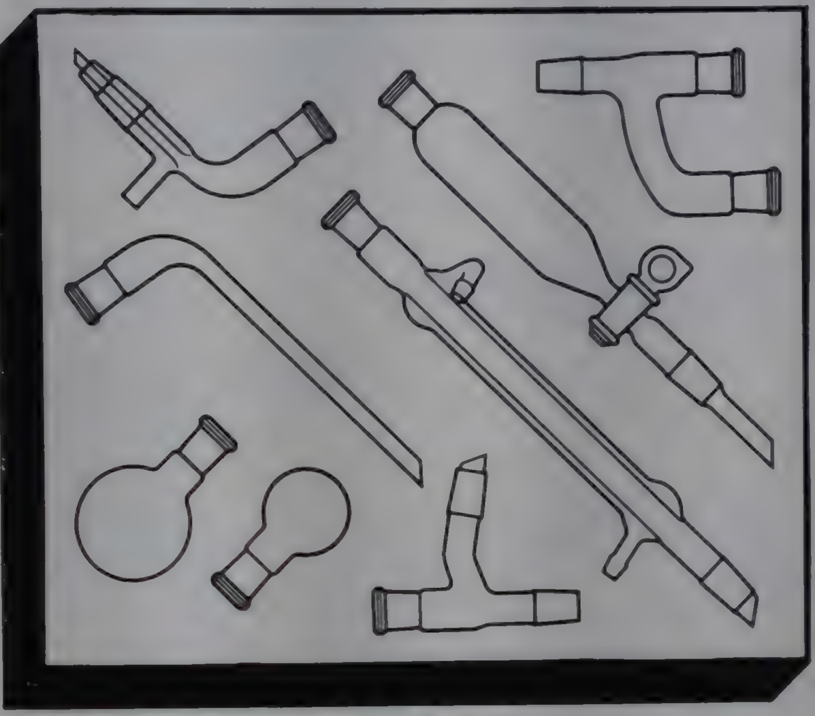
For details and prices of replacement components see listing under **QUICKFIT APPARATUS.**

All items on this page normally available from stock.

CLEARFIT ONE JOINT SETS

Clearfit conical glass joints are manufactured by a new process which achieves a fine precision fit without the necessity of grinding. This provides the following advantages:

- **Greater strength**
- **Reduced leakage and creep**
- **Less contamination, easier cleaning**
- **Greasing rarely necessary**
- **Reduced seizing or sticking**
- **Reduced alkali attack**
- **Transparent for internal observation**
- **Interchangeable with ground joints**



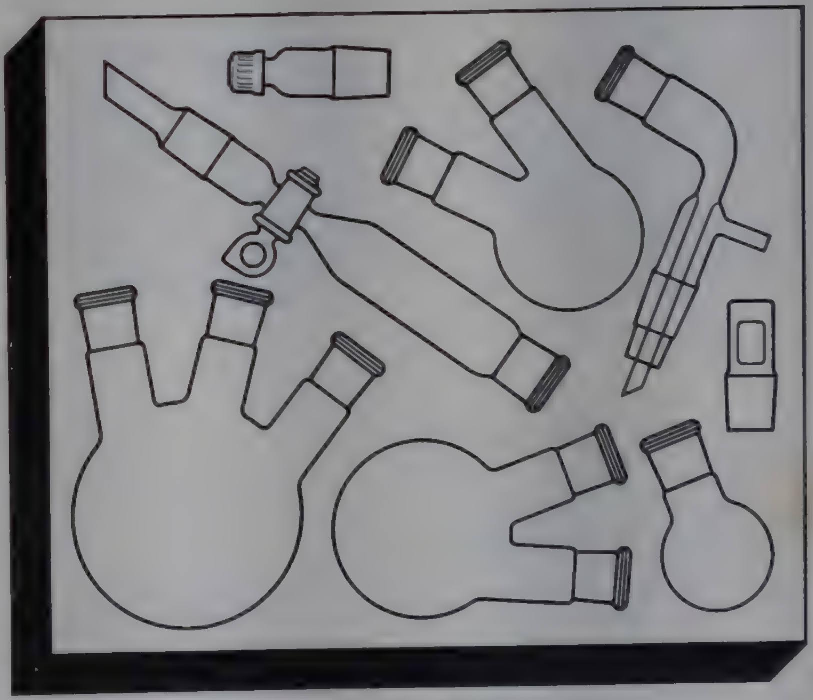
DT-900 (Box 1)

DT-900

CLEARFIT 19/26 ONE JOINT SET KA2/11 comprising components with 19/26 joints listed below, supplied in two storage boxes, each 47 × 39 × 13·5 cm fitted with moulded polystyrene trays. Total weight 3·5 kg.

Box 1		**Box 2**	
Q-KC1/12	Condenser.	Q-KFR250/2S/22A	Flask.
Q-KD1/22	Funnel.	Q-KFR500/2S/22A	Flask.
Q-KFR50/2S	Flask.	Q-KSB19	2 stoppers.
Q-KFR100/2S	Flask.	Q-KST52/13	2 adapters.
Q-KMA1/2	Adapter.	Q-KST20/2	Gland.
Q-KRA1/12	Adapter.	Q-MF5	Inlet tube.
Q-KRA3/22	Adapter.	Q-MU31/1	Thermometer.
Q-KSH4/2	Stillhead.	Q-MU31/2	Thermometer.
		Q-ST6/7	Stirrer.
		Q-ST7/2	Stirrer.

Set **£22. 0. 0.** Set (per two off) **£19. 16. 0.** *m*



DT-920 (Box 2)

DT-920

CLEARFIT 29/32 ONE JOINT SET KA4/11 comprising components with 29/32 joints listed below, supplied in two storage boxes, each 47 × 39 × 15·5 cm fitted with moulded polystyrene trays. Total weight 4·4 kg.

Box 1		**Box 2**	
Q-KC1/44/30	Condenser.	Q-KD1/2/44	Funnel.
Q-KMA1/44	Adapter.	Q-KFR100/4S	Flask.
Q-KRA1/14	Adapter.	Q-KFR250/4S/4A	Flask.
Q-KSB29	Stopper.	Q-KFR500/4S/4A	Flask.
Q-KSH4/444	Stillhead.	Q-KFR1L/4S/44A	Flask.
Q-KST2/44/7	Stirrer.	Q-KRA3/44	Adapter.
Q-KST54/18	Adapter.	Q-KSB29	Stopper.
Q-KST20/4/6	Gland.	Q-KST54/18	Adaptor.
Q-ST6/7	Stirrer.		
Q-ST7/3	Stirrer.		

Set **£26. 10. 0.** Set (per two off) **£23. 17. 0.** *m*

For details and prices of replacement components see listing under **QUICKFIT APPARATUS.**

All items on this page normally available from stock.

DRAINING BOARDS see FURNITURE
DRECHSEL BOTTLES see GAS WASHING
DRILLS see TOOLS
DROPPING BOTTLES see BOTTLES
DROPPING FUNNELS see FUNNELS
DRY BOXES see MANIPULATOR BOXES
DRYING, ovens see OVENS
towers and tubes see ABSORPTION APPARATUS

DUST EXAMINATION

Hexhlet
Cascade impactor
Thermal precipitator
We shall be pleased to supply detailed catalogues and quotations on application for all apparatus for dust examination.

Andreasen pipette
Sedimentation balance
see PARTICLE SIZE

Dust and moisture estimation apparatus see GAS SAMPLING

EBULLIOMETERS see MOLECULAR WEIGHT

ELECTRICAL APPARATUS

Section Index

This section is divided into three groups as shown below. The fourth list shows those items which will be found in other parts of the catalogue.

ELECTRICAL ACCESSORIES

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Indicator 215
Lampholder 215
Plugs 215
Sockets 215/6
Spade ends 216
Switches 216
Terminals 216
Terminal blocks 216
Terminal clips 216
Test prod 216
Insulating tape 216
Wire and cables 217

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Moving coil meters 224
Moving iron meters 225
Multirange meters 226/8
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Potentiometers 233
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Resistance bridges 230
Signal generators 236
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Valve voltmeter 232
Voltage reference batteries 232

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Power supply unit 223
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Sliding resistances 221
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Transformers, variable 222
Transistorised relay 218

OTHER ELECTRICAL ITEMS

Other items of electrical equipment are listed in this catalogue under the following headings:

Batteries
Battery chargers
Electrochemical apparatus
Heaters, immersion, etc.
Lamps
Lubricant, contact
Motors
Pyrometers
Thermoregulators

EB-050
ADAPTER, 5A 3-pin, with twin 5A shuttered socket outlets. For plugs and sockets to BS 546. Moulded bakelite. Pack of five **£1.16. 8.** Each **£0.8. 3.** *m*

EB-055
ADAPTER, 15A 3-pin, with two shuttered socket outlets, one fused 5A and one 15A. For plugs and sockets to BS 546. Moulded bakelite.
Pack of five **£2. 3. 9.** Each **£0. 9. 6.** *m*

EB-060
ADAPTER, 13A 3-pin, with twin 13A shuttered socket outlets. For plugs and sockets to BS 1363. Moulded bakelite. Pack of five **£1.17.11.** Each **£0. 8. 6.** *m*

EB-090
CONNECTOR, snap-action. A very useful device for making temporary connections of electrical apparatus to mains. The spring loaded terminals have a large contact area and provide a firm grip and adequate electrical protection. They are colour coded, red, green and black. A double pole on/off switch with fuse EB-124 forms part of the cover and ensures that accidental contact with live terminals cannot be made when the cover is open. Supplied without cable ... ... Each **£2. 2. 6.** *m*

EB-120
FUSES, cartridge, to BS 2950A, $1\frac{1}{4} \times \frac{1}{4}$ in dia. Available capacities 60, 150, 250, 500 mA, and 1, 2, 3, 5, 7·5, 10, and 15A.
Carton of 100 **£2. 0. 0.** Pack of 10 **£0. 5. 4.** *m*

When ordering please state fuse capacity.

EB-124
FUSES, cartridge, to BS 1362, $1 \times \frac{1}{4}$ in dia. for plugs EB-435 and EB-445. Available capacities, 2, 5, 10 and 13A.
Ten packs of 10 **£3.10.10.** Pack of 10 **£0. 8. 3.** *m*

When ordering please state fuse capacity.

EB-185
INDICATOR, NEON, cylindrical snap-in type with red lens and 9 in attached terminal leads. For panels between $\frac{1}{32}$ in and $\frac{3}{32}$ in thick. Requires 0·545 in dia. mounting hole. For 200/250V.
Dozen **£1.15. 0.** Each **£0. 4. 5.** *m*

EB-315
LAMPHOLDER, SBC cord mounting, moulded bakelite with rubber cord grip.
Dozen **£1. 3. 0.** Each **£0. 3. 6.** *m*

PLUGS AND SOCKETS, 3-pin, to BS 546.

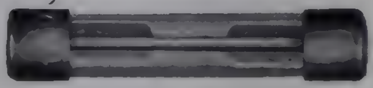
	5A		15A		
	Pack of 5	Each	Pack of 5	Each	
EB-400 **SOCKET OUTLETS,** shuttered, bakelite, surface mounting	23/4	5/10	30/–	7/–	*m*
	Pack of 10	Each	Pack of 10	Each	
EB-405 **PLUGS,** bakelite ...	28/4	4/4	35/10	5/–	*m*

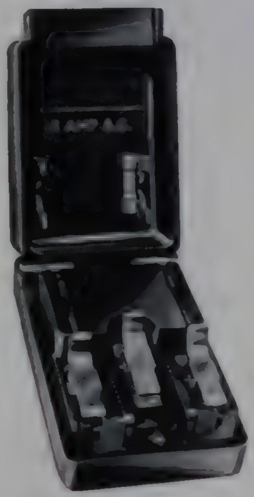
PLUGS AND SOCKETS, 3-pin 13A, to BS 1363.

	Pack of 5	Each	
EB-430 **SOCKET OUTLET,** shuttered, bakelite, surface mounting	19/2	5/2	*m*
	Pack of 10	Each	
EB-435 **PLUG,** fused, bakelite	35/–	4/11	*m*
EB-445 **PLUG,** fused, with switch	65/–	7/6	*m*

EB-050

EB-060


EB-120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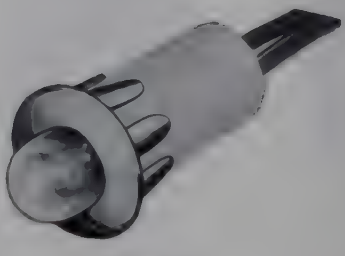
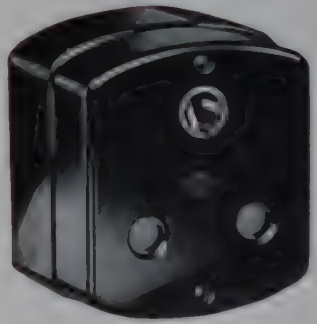

EB-185

EB-315


EB-400

EB-405

EB-430

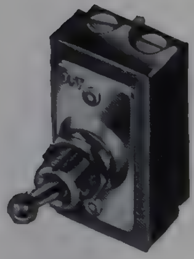
EB-445

All items on this page normally available from stock.

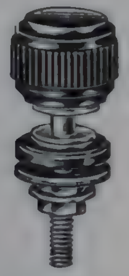
EB-460

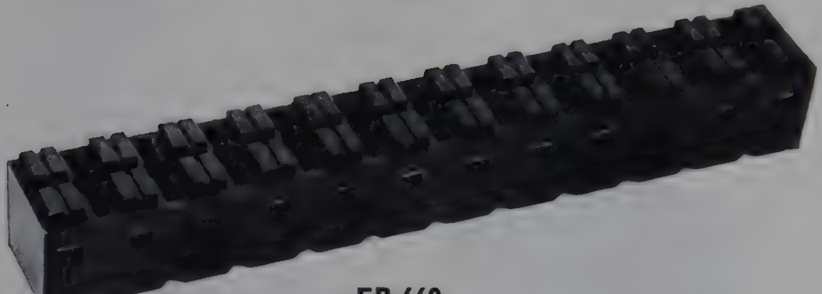
EB-480

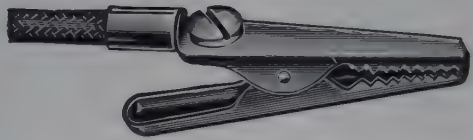
EB-530

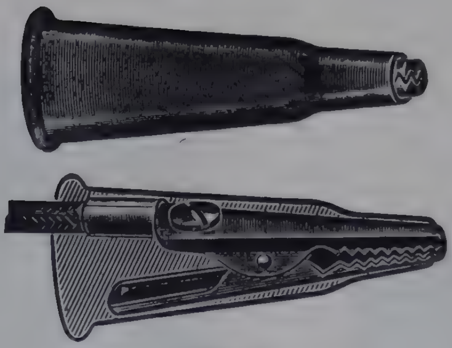

EB-570

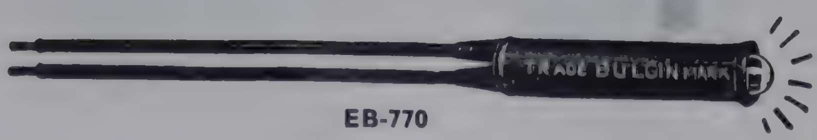
EB-600


EB-650


EB-660


EB-700


EB-710



EB-770

EB-460

MULTIPLE SOCKET OUTLET, with five 13A sockets to BS 1363 housed in a rigid PVC and earthed aluminium case for standing on bench. A micro circuit breaker will withstand a momentary surge in excess of 60A but trips on extended overload before a 13A fuse blows. An indicator lamp shows when the circuit is live and the unit complies with IEE regulations ... Each **£6. 0. 0.** *m*

EB-480

SPADE ENDS, with insulated sleeve coloured red or black ... Gross **£7. 0. 0.** Dozen **£0. 12. 9.** *m*

When ordering please state colour required.

EB-530

SWITCH, MICRO, 5A, single pole changeover for 250V a.c. maximum.
Dozen **£6. 0. 0.** Each **£0. 11. 0.** *m*

EB-570

SWITCH, 10A double pole, snap-action, flush mounting.
Dozen **£5. 10. 0.** Each **£0. 10. 0.** *m*

EB-600

SWITCH, 3-heat rotary snap-action, surface mounting. Porcelain base with bakelite cover. 15A capacity.
Each **£1. 3. 3.** *m*

EB-650

TERMINALS, panel mounting. nickel plated brass with insulated mouldings. Coloured red or black.

Thread	4	2 BA	
Dozen	22/–	35/–	*m*
Each	3/5	4/5	

When ordering please state colour required.

***EB-660**

TERMINAL BLOCKS, 25A, 12-way moulded hard plastics with spring loaded press button terminals. Provides secure connections quickly assembled or dismantled without tools. The block can be cut into smaller units as required ... Dozen **£5. 6. 0.** Each **£0. 9. 9.** *m*

EB-700

TERMINAL, crocodile clip, plated steel.
Dozen **£0. 7. 6.** *m*

EB-710

TERMINAL, crocodile clip, as EB-700 but with rubber insulating sleeves, supplied in pairs of one red and one black ... Dozen pairs **£1. 18. 0.** Pair **£0. 4. 7.** *m*

EB-770

TEST PROD, with neon indicator lamp, safety resistor and two test prods. It will indicate polarity, leakage, short circuits, etc. in a.c. and d.c. circuits. Completely enclosed in plastics moulded cover.
Dozen **£4. 4. 0.** Each **£0. 8. 0.** *m*

EB-780

INSULATING TAPE, polythene, heavy duty elastic tape with outstanding electrical properties. Waterproof and resistant to chemical attack. In red, green or black, and in rolls of 36 yds ¾ in wide on 1 in core.
Each **£0. 8. 6.** *m*

When ordering please state colour required.

All items on this page normally available from stock.

WIRE

EB-800

WIRE, tinned copper, uninsulated, 18 SWG.

1 lb reel **£1. 3. 6.** *c*

EB-805

WIRE, double cotton covered (DCC) copper.

Gauge	16	18	20	22	24 SWG	
1 lb reel	**28/6**	**29/6**	**31/–**	**34/–**	**37/–**	*c*

EB-830

FLEXIBLE CABLE, PVC covered, single core stranded tinned copper, 23/·0076, 5A. On reels of nominal 25 yds in red, black or brown ... ... Reel **£0. 14. 3.** *c*

When ordering please state colour required

EB-860

FLEXIBLE CABLE, 3-core, rubber insulated and tough rubber sheathed. CMA 250V grade.

Specification of wire	23/·0076	70/·0076	
Current rating	5A	15A	
100 yds	**150/–**	**320/–**	*m*
Yard	**3/3**	**4/11**	

EB-920

WIRE, 80/20 nickel chromium alloy, a high grade resistance wire suitable for heater windings.

SWG	Dia. mm	ohms/ft at 20°C	4 oz	1 lb	
20	·914	0·501	**16/–**	**40/–**	*c*
22	·711	0·829	**16/6**	**42/–**	*c*
24	·559	1·34	**17/6**	**45/–**	*c*
36	·193	11·2	**23/–**	**72/–**	*c*

FLEXIBLE CONNECTORS, insulated, for interconnecting electrical equipment fitted with standard 4 mm sockets. Comprising a length of 15A cable with a combined plug/socket at either end.

The design permits several connectors to be plugged in, one on top of the other, to a single apparatus terminal. Available in red or black.

		Length	0·5	1·0 metre	
EB-940	**Red**	Each	**5/5**	**5/6**	*m*
EB-942	**Black**	Each	**5/5**	**5/6**	*m*

POWER CONTROLLERS

INCORPORATING ENERGY REGULATORS

For controlling power input by periodically and automatically switching on and off the electrical supply. The ratio of 'on' time to total cycle time determines the average input and is infinitely variable. Because of their small size, continuously variable adjustment and freedom from power loss, these energy regulators can, to advantage, replace three-heat switches and resistance controls on most forms of heating equipment.

OPERATION

The regulator is essentially a single-pole switch having one contact mounted on a bimetal strip wound with a heater. When the switch is closed, current flows through the heater. The bimetal increases in temperature and opens the switch, thus breaking the supply to the heater. When the bimetal cools the cycle is repeated. The ratio of the 'on' to the total time and thus the average input is controlled by a cam operated by the control knob.

CHARACTERISTICS

Continuous and maximum current ratings are given for each regulator. The continuous rating applies when the apparatus is normally required to run for long periods. The maximum rating should be used only when the apparatus is to be used for periods of one or two hours per day. For d.c. supplies the regulator contacts will only switch 0·1A and so they must always be used with a relay such as ED-101.

Energy regulators provide automatic compensation for changes in the supply line voltage.

The controllers listed are all fitted with non-linear regulators which are suitable for controlling heating apparatus e.g. furnaces, which, in order to have a high heating rate, have higher power heaters than are required to maintain the maximum temperature. 50% power setting is at a scale reading of about 90.

SUMMARY OF CHARACTERISTICS

List No.	Mains connection	Output connection	Voltage V	Current rating on a.c. supplies	
				Continuous A	Maximum A
EC-750	5A 3-pin plug	Cable	200/250	5	5
EC-755	5A 3-pin plug	5A 3-pin socket	200/250	5	5
EC-760	13A 3-pin plug	13A 3-pin socket	200/250	6	13
EC-810	Cable	Cable	100/130	6	13·5
EC-810	,,	,,	200/250	4·3	11
EC-820	,,	,,	200/250	6	15
EC-840	15A 3-pin plug	,,	200/250	6	15
EC-845	13A 3-pin plug	,,	200/250	6	13
EC-900	For panel mounting		200/250	4·3	11
EC-910	,, ,,	,,	220/230 240/250	4·3	11

Detailed listing—see following pages.

All items on this page normally available from stock.

Gallenkamp ELECTRICAL CONTROLS

EC-750

EC-760

MAINS
LOAD
Gallenkamp

EC-780

POWER CONTROLLERS, *Gallenkamp*. These controllers are mounted in stove enamelled steel cases fitted with indexing control knob with arbitrary scale divided 0–100. They all employ the same energy regulator but EC-750 and EC-755 are limited by the rating of the socket outlets. On EC-760 the maximum rating should only be used intermittently for periods up to 1 hour.

The controllers are suitable for use on 200/250V a.c. single phase supplies only.

Technical information—see page 217.

EC-750

POWER CONTROLLER, *Gallenkamp*, as specification, designed to plug into a 5A 3-pin socket outlet to BS 546 and to accept a 3-core cable for connection to apparatus to be controlled. Rating 5A continuous and maximum. Each **£4. 6. 0.** *b*

EC-755

POWER CONTROLLER, *Gallenkamp*, as specification, designed to plug into a 5A 3-pin socket outlet to BS 546 and to accept a 5A 3-pin plug connection from the apparatus to be controlled. Rating 5A continuous and maximum. Each **£4. 8. 0.** *b*

EC-760

POWER CONTROLLER, *Gallenkamp*, as specification, designed to plug into a 13A 3-pin socket outlet to BS 1363 and to accept a 13A 3-pin plug connection from the apparatus to be controlled. A 13A fuse is fitted. Rating 6A continuous, 13A maximum ... ... Each **£4. 16. 0.** *b*

EB-124 **Fuse,** 13A cartridge for above. For price see entry in List No. sequence.

ELECTRONIC RELAY, *Gallenkamp*. A mains powered transistorised relay which in effect converts a low current switch into a power switch. A typical and important application is its use with a thermoregulator or contact thermometer to control heater switching; a contact thermometer by itself can switch only a few milliamperes, but using the transistorised relay as a coupling, currents of up to 20A can be switched in each of two non-inductive mains voltage circuits.

The low voltage control circuit is intrinsically safe and a 2-pin plug connector is supplied for attachment to the leads of the contact thermometer.

TECHNICAL DATA

Dimensions	H W D 19 × 11·5 × 7·5 cm
Power contacts	Double pole changeover rated at 20A, 250V a.c. non-inductive, or 1A, 220V d.c.
Control circuit	8V d.c. open circuit 12 mA closed circuit The control circuit is normally earthed but may be used independently in which condition the voltage between the control circuit and earth must not exceed 250V

EC-780

ELECTRONIC RELAY, *Gallenkamp*, as specification. Completely enclosed in a die-cast light alloy box suitable for wall or bench mounting and fitted with mains and load indicator lamps and connecting block for load and mains supply. Includes instructions with illustrated examples of typical circuit applications. **Without mains or load circuit cables.**

For 200/250V a.c. single phase supplies. Each **£14. 15. 0.** *b*

For 110/120V a.c. single phase supplies. Each **£15. 0. 0.** *b*

When ordering please state voltage and nature of supply.

All items on this page normally available from stock.

POWER CONTROLLERS

INCORPORATING NON-LINEAR ENERGY REGULATORS

EC-810

CONTROLLER, for in-line connection. An energy regulator fitted inside a metal case and suitable for controlling small furnaces, hotplates, water baths, etc. It has an arbitrary scale 0–100. Current rating 6A on continuous duty, 13·5A maximum on 100/130V a.c. single phase or 4·3A continuous duty 11A maximum on 200/250V a.c. single phase. **Supplied without leads.** Each **£2.12. 6.** *m*

When ordering please state voltage and nature of supply.

EC-820

CONTROLLER, for in-line connection. Comprises an energy regulator fitted inside a plastics case with a sloping front panel on which a neon indicator light is mounted. Suitable for controlling 6A on continuous duty, 15A maximum, on 200/250V a.c. single phase supply. Each **£4. 3. 0.** *m*

EC-840

CONTROLLER, with 3-pin input plug. An energy regulator enclosed in a plastics case which forms an integral part of a 3-pin 15A plug to BS 546. Suitable for controlling small furnaces, hotplates, water baths, etc. It has an arbitrary scale 0–5. Current rating 6A on continuous duty, 15A maximum, on 200/250V a.c. single phase supplies only. With terminals for cable outlet connection ... ... Each **£1.15. 0.** *m*

EC-845

CONTROLLER, with 3-pin input plug. An energy regulator enclosed in a plastics case which forms an integral part of a 3-pin 13A plug to BS 1363. Fitted with an easily replaceable 13A cartridge fuse. Suitable for controlling small furnaces, hotplates, water baths, etc. It has an arbitrary scale 0–5. Current rating 6A on continuous duty,, 13A maximum, on 200/250V a.c. single phase supplies only. With terminals for cable outlet connection ... ... Each **£1.17. 6.** *m*

EB-124 **Fuse, 13A cartridge for above.** For price see entry in List No. sequence.

ENERGY REGULATORS

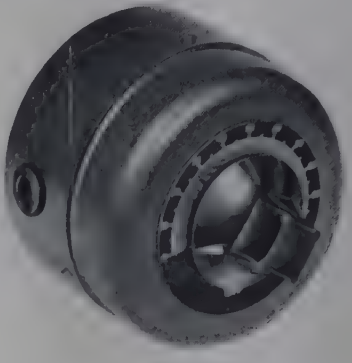
FOR PANEL MOUNTING

These regulators are intended for single hole fixing on panels between 1·6 mm and 8·0 mm thick. They are supplied with a plain indexed knob, arbitrary scale of 0–100 divisions, and screw terminal connections. Dimensions behind panel, approx. 5×5×5 cm including terminals.

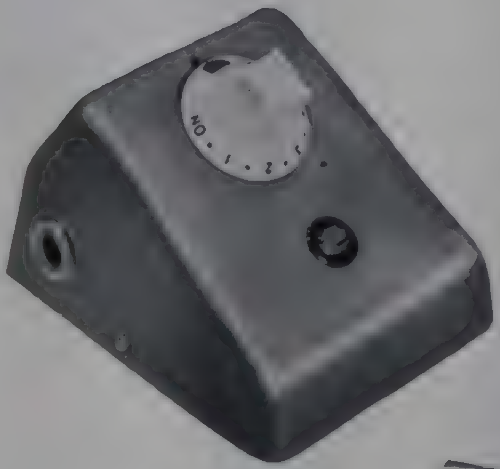
EC-900

ENERGY REGULATOR, type ERX. A regulator with a **non-linear** scale reading/power output characteristic. The power output increases very rapidly at the upper end of the scale so that this regulator is most convenient for use with hotplates, furnaces, etc., which have a high heat capacity and therefore require considerably more power for heating than for maintaining temperature. Current rating 4·3A for continuous duty, 11A maximum, on 200/250V a.c. single phase supplies. For higher currents and d.c. supplies a relay such as ED-101 must be used with the regulator ... ... Each **£1. 5. 0.** *m*

Also available for other voltages to order.

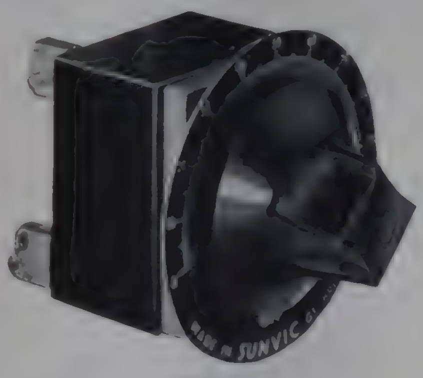


EC-810



EC-820

EC-840



EC-900
EC-910

EC-910

ENERGY REGULATOR, type ERX/L. A regulator with a **linear** scale reading/power output characteristic. Best suited for controlling apparatus such as low temperature water baths and ovens in which the power requirement varies in an approximately linear manner with temperature. Current rating 4·3A for continuous duty, and 11A maximum, on 220/230V or 240/250V a.c. single phase supplies. For higher currents or d.c. supplies a relay such as ED-101 must be used with the regulator. Each **£2.15. 6.** *m*

Also available for other voltages to order.

When ordering please state voltage and nature of supply.

All items on this page normally available from stock.

HOTWIRE VACUUM RELAYS

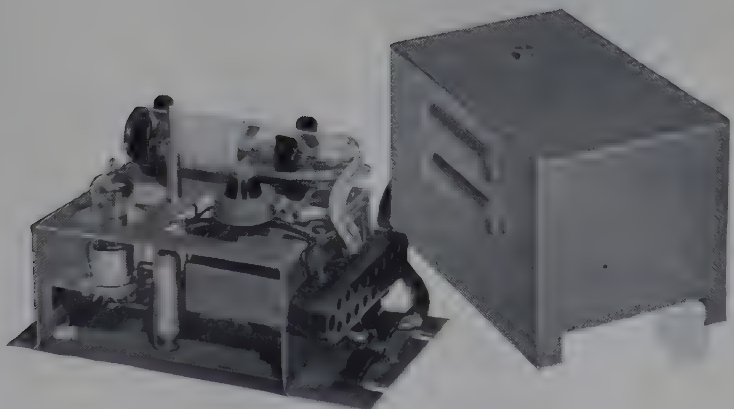
The HVR is a successor to types F101 and F102 range of Sunvic HVS relays and is physically interchangeable with them. In the HVR, circuits /3 /4 /5 and /11 have been combined and a selector for a range of voltages is fitted. The HVR and HVS include a Metrosil surge suppressor as standard.

OPERATION

The HVR and HVS relays have an evacuated sealed relay tube in which the contacts are mounted. These are operated by the thermal expansion of a wire through which the control current passes. The magnitude of the current is controlled by external resistances to between 25 mA for the smallest tube to 70 mA for the largest. The period of 2 or 3 seconds which the wire takes to heat or cool causes a delay in the operation of the contacts thus preventing 'chattering'. This delay, combined with the small non-inductive control current requirements, allows sensitive thermostats to be used with the relay to control high a.c. or d.c. loads. Currents of up to 30A and voltages up to 600V may be controlled.

Hotwire relay switches are suitable for thermostats such as the bimetallic type with 'normally closed' contacts and for liquid expansion thermoregulators and contact thermometers with 'normally open' contacts. The HVR is for use with either, whereas the HVS 103/3M is for use only with 'normally closed' and the HVS 103/4M only with 'normally open' contacts. Most contact thermometers, however, are better used with electronic relays such as EC-780 and ED-200, etc.

ED-101



ED-200

Gallenkamp **transistorised electronic relay**
see page 218

ED-101

RELAY, HOT WIRE VACUUM, Type HVR, **normally closed or open,** as specification, suitable for controlling loads up to 1·2 kVA on 100/110V and 2·0 kVA on 200/250V supplies.

For 200/250V a.c. single phase supplies. Each **£5. 16. 6.** *m*
For 100/130V a.c. single phase supplies. Each **£5. 16. 6.** *mN*

When ordering please state voltage and nature of supply.

ED-104

RELAY, HOT WIRE VACUUM, Type HVS 103/3M, **normally closed,** as specification, suitable for controlling loads up to 2·0 kVA on 100/110V and 3·5 kVA on 200/250V supplies.

For 240/250V a.c. single phase supplies. Each **£7. 18. 6.** *m*
For 100/110, 200/210 or 220/230V a.c. single phase supplies. Each **£7. 18. 6.** *mN*

ED-106

RELAY, HOT WIRE VACUUM, Type HVS 103/4M, **normally open,** as specification, suitable for controlling loads up to 2·0 kVA on 100/110V and 3·5 kVA on 200/250V supplies.

For 240/250V a.c. single phase supplies. Each **£8. 7. 0.** *m*
For 100/110, 200/210 or 220/230V a.c. single phase supplies. Each **£8. 7. 0.** *mN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

ED-110	**Relay tube,** type 602, for ED-101.	Each **£2. 18. 6.**	*m*
ED-112	**Relay tube,** type 603, for ED-104 or ED-106.	Each **£3. 16. 0.**	*m*

Details of other available types of HVS relays including those for 3-phase operation supplied on request.

ELECTRONIC RELAY

This relay, designed for use with the most sensitive types of toluene regulators and contact thermometers, operates on a few microwatts, yet it will control loads up to 1·2 kVA on 110/120V and 2·0 kVA on 200/250V. The relay contacts are closed when the control contacts are open. The relay can only be used on a.c. circuits but the HVS tube can be used to control a.c. or d.c. loads.

CONSTRUCTION

The relay comprises an hot wire evacuated relay tube controlled by a thyratron relay valve which, together with a transformer, is enclosed in a stove enamelled metal case 10×16·5×10 cm high, weighing about 1·4 kg.

ED-200

RELAY, ELECTRONIC, Type EA4, as specification, **for non-inductive loads.**

For 200/250V a.c. single phase supplies. Each **£10. 12. 0.** *f*
For 110/120V a.c. single phase supplies. Each **£10. 12. 0.** *fN*

ED-210

RELAY, ELECTRONIC, Type EA4M, as ED-200, but incorporating a surge suppressor **for inductive loads.**

For 200/250V a.c. single phase supplies. Each **£10. 12. 0.** *f*
For 110/120V a.c. single phase supplies. Each **£10. 12. 0.** *fN*

ED-220

RELAY, ELECTRONIC, Type EA4T, as ED-200, but with circuit modification **for use in conjunction with the toluene regulator proportioning head.** (See TM-470 in List No. sequence.)

For 240/250V a.c. single phase supplies. Each **£10. 16. 0.** *f*
For 100/110V or 220/230V a.c. single phase supplies. Each **£10. 16. 0.** *fN*

REPLACEMENT PARTS

ED-225	**Thyratron relay valve**	Each **£1. 4. 6.**	c
ED-110	**Relay tube,** type 602. For price see entry in List No. sequence.		

Items on this page normally available from stock except those coded *N*.

SLIDING RESISTORS

SLIDING RESISTORS

A range of ruggedly constructed tubular resistors, using diecast end plates and solid drawn steel tubes with steel tie rods. Light weight construction and good ventilation give rapid temperature stabilisation.

ED-300 to ED-306

INSULATION

The oxidised copper-nickel alloy wire is wound on vitreous enamelled tube. Mycalex and phenolic mouldings insulate current carrying parts. The units are designed for use at 250V maximum and are all flash tested at 2000V a.c.

CONNECTIONS

The sliding contacts are of the tensioned multi-leaf metal type and are of ample section to carry the maximum rated current. The three insulated terminals accept either 4 mm plugs, spade type connectors, or wires.

PROTECTION

Open types should only be used on low voltages. **Enclosed types** must be used for mains circuits and wherever over 100V is applied.

ED-320 to ED-324

RANGES

A popular range of resistors are listed below and are normally available for delivery from our stock. We shall be pleased to quote for and supply resistors of any type required but owing to the enormous number of alternatives these are made to order. The available patterns include single or double tubes in four diameters and eight lengths, open or protected type, graded or non-inductive windings and lead-screw motion. When ordering or enquiring for specials please state maximum current to be carried, total resistance required, whether open or enclosed type and whether any other special features required.

SLIDING RESISTORS, open type, for use with safe low voltage.

List No.	Max. amps	Resistance ohms	Tube size cm	Each	
ED-300	10	2·8	25×3	**£3. 12. 0.**	*m*
		5·7	30×5	**£4. 18. 0.**	*m*
		11	45×6	**£7. 0. 0.**	*m*
ED-302	5	11·6	25×3	**£3. 12. 0.**	*m*
		23	30×5	**£4. 18. 0.**	*m*
		45	45×6	**£7. 0. 0.**	*m*
ED-304	2	56	25×3	**£3. 12. 0.**	*m*
		113	30×5	**£4. 18. 0.**	*m*
		215	45×6	**£7. 0. 0.**	*m*
ED-306	1	265	25×3	**£3. 12. 0.**	*m*
		535	30×5	**£4. 18. 0.**	*m*
		1040	45×6	**£7. 0. 0.**	*m*

SLIDING RESISTORS, enclosed type, for use with mains voltage.

List No.	Max. amps	Resistance ohms	Tube size cm	Each	
ED-320	2	56	25×3	**£5. 4. 0.**	*m*
		113	30×5	**£7. 5. 0.**	*m*
		215	45×6	**£10. 10. 0.**	*m*
ED-322	1	265	25×3	**£5. 4. 0.**	*m*
		535	30×5	**£7. 5. 0.**	*m*
		1040	45×6	**£10. 10. 0.**	*m*
ED-324	0·45	765	25×3	**£5. 4. 0.**	*m*
		1500	30×5	**£7. 5. 0.**	*m*
		2950	45×6	**£10. 10. 0.**	*m*

When ordering please state ohmic value.

All items on this page normally available from stock.

VARIABLE TRANSFORMERS

Variac toroidially wound variable autotransformers provide smooth stepless voltage regulation over the whole output range with clear indication of setting on a calibrated 320° scale.

VOLTAGE CONNECTIONS

Line-Voltage. The input is applied across the whole winding and the output is variable from zero up to input line voltage.

Over-Voltage. The input is applied across less than the whole winding by means of the tapping provided, giving a step-up in voltage.

ED-602

ED-660 to ED-666

CURRENT RATINGS

Based on a temperature rise not exceeding 55°C for continuous duty, in an ambient not exceeding 45°C.

Rated Current can be drawn at any voltage setting. When the over-voltage connection is used, the load should not draw more than rated current.

Maximum Current can only be drawn at or near full output voltage, or near zero output, when the line-voltage connection (see above) is used. The maximum current may be as much as 55% greater than the rated current, according to *Variac* type. A constant-impedance load (i.e. one drawing current proportional to applied voltage) which draws maximum current at line voltage can be controlled from zero to line voltage.

For loads which are not of constant impedance, the current drawn at line voltage should normally be limited to the rated current.

TRANSFORMERS, *Variac*, bench mounting, in ventilated case fitted with screened terminals.

Input 240V 50/60 Hz single phase.
Output 0—240V for line-voltage connection.
0—270V for over-voltage connection.

List No.	Type No.	Rated current (amps)	Maximum current (amps)	Each	
ED-600	V3H-M	1	1·13	**£7. 18. 0.**	*fS*
ED-601	V5H-M	2	2·5	**£9. 0. 0.**	*fS*
ED-602	V6H-M	3	3·75	**£11. 19. 0.**	*fS*
ED-604	100R-M	8	9·0	**£19. 2. 0.**	*fS*
ED-606	V30H-M	15	17·5	**£47. 15. 0.**	*f*
ED-608	50B-M	20	31·0	**£65. 15. 0.**	*f*

All models are centre-tapped and can be used on 120V input to give 0—240V output. In this case the current drawn must not exceed half the rated current.

TRANSFORMERS, *Variac* **portable,** consisting of transformer mounted in metal case with carrying handle, complete with mains switch, cartridge fuse and 6 ft length of 3-core cable. The output may be fitted with either a 13A 3-pin socket to BS 1363 or a pair of shrouded terminals. The *Variac* scale indicates the output voltage but more accurate readings may be obtained on models fitted with a voltmeter. Supplied in over-voltage connection.

Input 240V 50 Hz single phase. Output 0–270V, 3A.

List No.	Type No.	Description	Each	
ED-660	V6 HPS	Socket outlet	**£17. 8. 0.**	*f*
ED-662	V6 HPSV	ED-660 with voltmeter	**£23. 7. 0.**	*f*
ED-664	V6 HPT	Shrouded terminals	**£17. 8. 0.**	*f*
ED-666	V6 HPTV	ED-664 with voltmeter	**£23. 7. 0.**	*f*

Items on this page coded *S* normally available from stock.

LOW VOLTAGE TRANSFORMER

ED-850

TRANSFORMER, rated at 6V, 10VA, totally enclosed in metal case, with output terminals and flexible lead for connecting to mains. For input voltage of 200/250V a.c.
Each **£1. 5. 0.** c

ED-850

LOW VOLTAGE SUPPLY UNIT

Designed for use in schools and technical colleges where it conveniently replaces accumulators and wet cells. Rated output of the unit when used on 250V, 50 Hz single phase mains supply is 40A at 0 to 14V and 32A at 14 to 18V. The unit is contained in an enamelled sheet metal box arranged for wall mounting. Dimensions 66×59×38 cm (26×23×15 in).

Controls

The unit is fitted with a 580W *Variac* transformer and a 580W mains transformer which controls the low voltage a.c. Two selenium cell rectifier stacks rectify low voltage a.c. to low voltage d.c. The output is selected by an a.c./d.c./off switch. Input and output circuit breakers are provided which automatically trip in event of shorts or overloads.

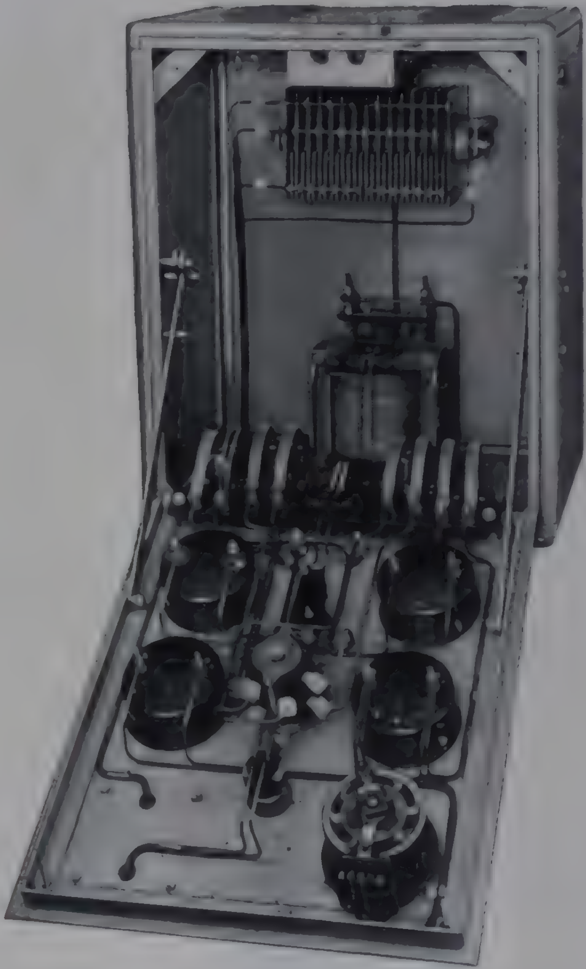
Indicators

Four 10 cm scale moving iron meters are incorporated in the control panel indicating input amperes and volts and output amperes and volts. A red pilot lamp clearly shows when the unit is live. For teaching purposes the control panel may be lowered to expose the clearly laid-out wiring system, which is dead and safe in this position.

ED-900

LOW VOLTAGE SUPPLY UNIT, as above specification, suitable for 250V, 50 Hz single phase supply.
Each **£99. 18. 6.** *fN*

Full technical specification on application.



ED-900
With front panel open to show wiring and isolating switch

REGULATED POWER SUPPLY UNIT

A portable power supply unit of robust construction suitable for many educational and other laboratory purposes. Contained in a stove enamelled steel case 25×15×10 cm with carrying handle and anodised aluminium panel. All terminals are clearly marked and of captive head insulated type with socket. A mains switch and indicator lamp are fitted. Input tappings are suitable for 100/125 or 200/250V 50/60 Hz single phase supply.

ED-925

POWER SUPPLY UNIT, as above specification.

Outputs (1) Continuously variable from 0 to 300V regulated d.c., the dial being marked in 10V intervals from 0 to 100V and in 25V intervals from 100 to 300V. Current available up to approx. 60 mA in upper and lower thirds of range and up to approx. 100 mA in 100 to 200V range.
(2) Unregulated a.c. supply 6·3V at 2A.
(3) Neon stabilised d.c. supply of—150V nominal, up to 7 mA.

Internal resistance Not greater than 5 ohms between 50 and 250V at 60 mA load.

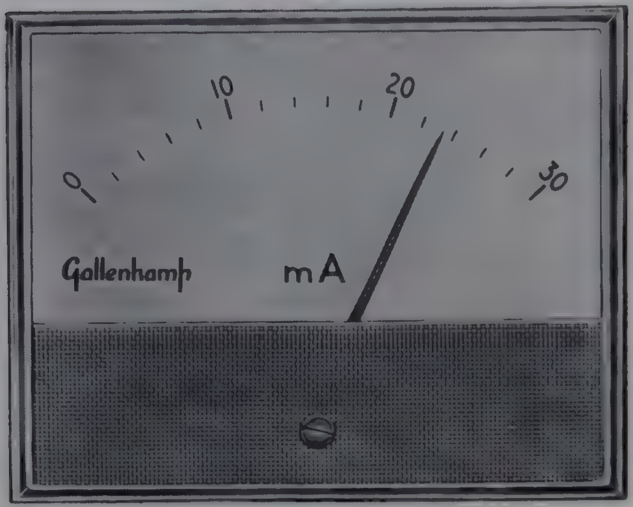
Ripple Approx. 25 mV R.M.S. at 60 mA load.
Each **£35. 9. 6.** *f*

FLEXIBLE CONNECTING CABLES with stackable 4 mm plug ends suitable for use with above, see EB-940 in List No. sequence.

ED-925

Items on this page normally available from stock except those coded *N*.

MOVING COIL METERS



EE-534

CLARITY RANGE, 95 mm SCALE

A range of high quality moving coil meters made to the requirements of BS 89 (1954) Industrial. Accuracy ±1% on d.c., ±2% on a.c. instruments.

SCALE AND CASE

These instruments, of new design and modern styling, have a completely transparent plastics front, the absence of a solid surround giving additional scale length and eliminating shadows. They are fitted with lance type pointer readily visible from a distance, but with a fine point for accurate readings.

Overall dimensions are 120×97 mm and a circular cut-out of 67·5 mm dia. is required for panel mounting.

SPECIAL METERS

We shall be pleased to quote on application for meters with other ranges, larger or smaller sizes, with anti-parallax mirrors, or centre or suppressed zeros. Any meter can be supplied in sloping bench stand to order.

D.C. INSTRUMENTS

EE-514

MICROAMMETER, D.C., moving coil, as specification.

Range 0 to	10	25	50	100 μA	
Resistance, approx.	9000	3000	1300	1000 ohms	
Each	**390/-**	**190/-**	**163/6**	**158/-**	c

EE-534

MILLIAMMETERS, D.C., moving coil, as specification.

Range 0 to	1	3	10	30	100 mA	
Each	**138/-**	**138/-**	**138/-**	**150/-**	**150/-**	c

EE-554

AMMETERS, D.C., moving coil, as specification.

Range 0 to	1	3	10	30A	
Each	**150/-**	**150/-**	**150/-**	**150/-**	c

EE-574

MILLIVOLTMETERS, D.C., moving coil, as specification. Sensitivity varies according to range.

Range 0 to	10	100 mV	
Each	**230/-**	**157/-**	c

EE-594

VOLTMETERS, D.C., moving coil, as specification. Sensitivity 1000 ohms/V.

Range 0 to	1	3	10	30	100V	
Each	**142/6**	**142/6**	**142/6**	**142/6**	**142/6**	c

A.C. INSTRUMENTS

EE-604

AMMETERS, A.C., moving coil, as specification, with rectifier and external current transformers suitable for use on mains frequencies.

Range 0 to	5	10	30A	
Each	**276/-**	**276/-**	**352/-**	c

EE-624

VOLTMETERS, A.C., moving coil, as specification, with rectifier. Sensitivity 1000 ohms/V.

Range 0 to	30	300V	
Each	**180/-**	**180/-**	c

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for standard packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'dozen' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about 50/0d. per dozen.

This system is intended to encourage ordering in standard packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

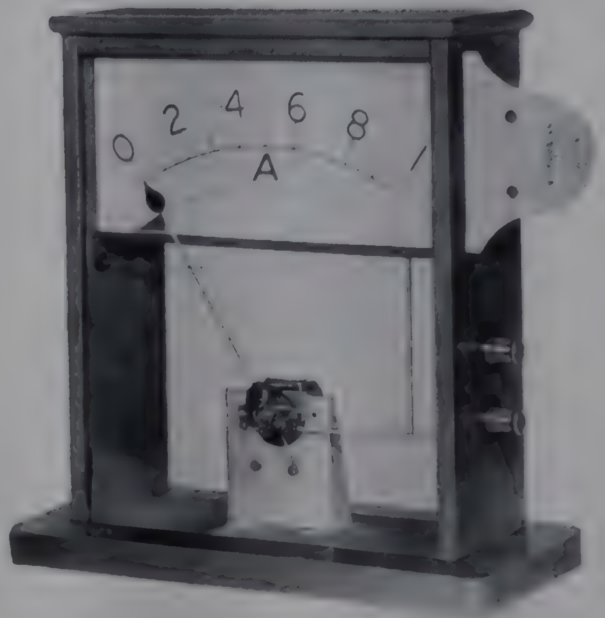
All items on this page normally available from stock.

INTERSCALE MOVING COIL METERS

A range of educational demonstration instruments with interchangeable dials for various ranges of a.c. or d.c. voltmeters or ammeters.

The movement is a high grade moving coil galvanometer, housed in a hardwood case. The working parts are visible through front and back glazed panels.

The interchangeable dials are of white finished laminated plastics material and each dial is fitted with the appropriate resin encapsulated range converter which plugs in to a coupler as the dial is inserted in the instrument. The dials have scales both front and back.



EE-660 with EE-663

EE-660

INTERSCALE METER, demonstration model, as above specification, 33×33×15 cm to accept dials as listed below with 20 cm scale. **Without dial.**

Each **£17. 6. 6.** *m*

DIALS for demonstration model meter EE-660 with 20 cm scale and resin encapsulated range converter.

EE-661 **Dial,** centre zero d.c. milliamp, scaled 2·5—0—2·5 mA.
Each **£3.13. 6.** *m*

EE-662 **Dials** for d.c. milliamp ranges.

Range 0 to	10	50	100	500 mA	
Each, any range	**£3.13. 6.**				*m*

EE-663 **Dials** for d.c. ampere ranges.

Range 0 to	1	5	10	A	
Each, any range	**£3.13. 6.**				*m*

EE-664 **Dials** for d.c. volt ranges.

Range 0 to	1	5	15	30	300 V	
Each, any range	**£3.13. 6.**					*m*

EE-666 **Dials** for a.c. milliamp ranges.

Range 0 to	10	50	100	500 mA	
Each, any range	**£6.16. 6.**				*m*

EE-667 **Dials** for a.c. ampere ranges.

Range 0 to	1	5	10	A	
Each, any range	**£6.16. 6.**				*m*

EE-668 **Dials** for a.c. volt ranges.

Range 0 to	5	15	100	300	V	
Each, any range	**£4.12. 0.**					*m*

MOVING IRON METERS

A range of economically priced bench type a.c./d.c. instruments for educational and general laboratory use. These moving iron, spring controlled meters have a 60 mm dial and are mounted in a robust aluminium case 85×90×80 mm with two captive head insulated terminals.

MILLI
AMPERES

EE-720
EE-722
EE-724

EE-720

MILLIAMMETERS a.c./d.c. moving iron, as specification.

Range 0 to	25	100 mA
Each	**£4.10. 0.**	**£4.10. 0.** *mS*

EE-722

AMMETERS, a.c./d.c. moving iron, as specification.

Range 0 to	2	5	10A
Each	**£4.10. 0.**	**£4.10. 0.**	**£4.10. 0.** *mS*

EE-724

VOLTMETERS, a.c./d.c. moving iron, as specification.

Range 0 to	15	250V
Each	**£4.10. 0.**	**£5.14. 0.** *mS*

Items on this page coded *S* **normally available from stock.**

MULTIRANGE METERS

Avo self-contained, portable, multirange a.c./d.c. measuring instruments are suitable for general laboratory and workshop testing. Accuracy of the meters is within BS 89 Industrial limits. Ranges are selected by means of two rotary switches and readings are indicated on a 12·5 cm calibrated scale fitted with an antiparallax mirror. Each instrument incorporates an automatic overload cut-out device. Overall dimensions: 20×19×11·5 cm, net weight approximately 3 kg. Details of accessories for extending measuring ranges are available on request.

EE-800
(EE-820 is similar)

EE-840

EE-800

MULTIRANGE METER, *Avo* **Model 7, Mark 2,** with forty-seven ranges designed around a 1 mA movement. Fitted with a press button for halving the value of any current or voltage range. Sensitivity 500 ohms/V on both a.c. and d.c. ranges, or 1000 ohms/V when the '÷2' button is depressed. Complete with rubber covered test leads, clips, long reach safety clips and instructions.

Ranges

d.c. voltage	12 ranges: 50 mV to 1000V
a.c. voltage	8 ranges: 5 to 1000V
d.c. current	10 ranges: 1 mA to 10A
a.c. current	8 ranges: 5 mA to 10A
resistance—with battery	3 ranges: 10,000 ohms to 1 megohm
resistance—with mains	2 ranges: 10 and 40 megohms
capacitance	1 range: 0·01 to 20 μF
decibels	3 ranges: −25 to +16db (reference level 50 mW in 500 ohms)

Each **£24. 10. 0.** *m*

EE-805

MULTIRANGE METER, *Avo* **Model 7X,** as above but tropicalised for use under adverse climatic conditions.

Each **£30. 0. 0.** *m*

EE-820

MULTIRANGE METER, *Avo* **Model 40, Mark 2,** with forty-one ranges, designed around a 6 mA movement. Fitted with a press button for halving the value of any current or voltage range. Sensitivity 166·6 ohms/V on both a.c. and d.c. ranges, or 333 ohms/V when the '÷2' button is depressed. Complete with rubber covered test leads, clips, long reach safety clips and instructions.

Ranges

d.c. voltage	12 ranges: 60 mV to 1200V
a.c. voltage	8 ranges: 6 to 1200V
d.c. current	9 ranges: 3 mA to 12A
a.c. current	8 ranges: 6 mA to 12A
resistance—with battery	3 ranges: 1,000 to 100,000 ohms
resistance—with mains	1 range: 1 megohm

Each **£24. 10. 0.** *m*

EE-840

MULTIRANGE METER, *Avo* **Model 8, Mark 3,** a high sensitivity meter with thirty ranges, designed around a 50 μA movement. Sensitivity 20,000 ohms/V on all d.c. ranges and 1,000 ohms/V on a.c. ranges from 100V upwards with increased sensitivity in the lower a.c. ranges. Fused ohm circuits and improved frequency characteristics are a new feature. Also improved temperature compensation which permits the use of accessory high current shunts up to 400A. Complete with rubber covered leads, clips, long reach safety clips and instructions.

Ranges

d.c. voltage	8 ranges: 2·5 to 2500V
a.c. voltage	7 ranges: 2·5 to 2500V
d.c. current	7 ranges: 50 μA to 10A
a.c. current	4 ranges: 100 mA to 10A
resistance—with battery	3 ranges: 2000 ohm to 20 megohms
resistance—with mains	1 range: 200 megohms

Each **£26. 10. 0.** *m*

High current shunts for use with above meter, details on application.

All items on this page normally available from stock.

MULTIRANGE METERS

(continued)

EE-845

MULTIRANGE METER, *Avo* **Model 8X,** as EE-840 but tropicalised for use under adverse climatic conditions.

Each **£32. 0. 0.** *m*

ACCESSORY

EE-850 **Ever ready carrying case,** for multirange meters EE-800 to EE-845 ... ... Each **£5. 4. 0.** *m*

EE-870

EE-870

MULTIRANGE METER, *Avo* **Multiminor Mark 4.** A pocket-sized meter with nineteen ranges selected by a single rotary switch. Readings indicated on 7 cm scale. Sensitivity 10,000 ohms/V on d.c. ranges and 1000 ohms/V on a.c. ranges. Dimensions 14×9×3·5 cm, net weight 0·45 kg. Complete with leads and clips in black plastics case.

Ranges

d.c. voltage	7 ranges:	100 mV to 1000 V
a.c. voltage	5 ranges:	10 to 1000 V
d.c. current	5 ranges:	100 μA to 1 A
resistance	2 ranges:	20,000 ohms and 2 megohms

Each **£9. 10. 0.** *m*

Taylor self-contained portable, multirange a.c./d.c. measuring instruments are suitable for general laboratory and workshop testing. Accuracy is within BS 89 industrial limits. All instruments have the patented *Taylor* centre pole movement.

EE-900
EE-920 is similar

EE-900

MULTIRANGE METER, *Taylor* **Model 88B,** a high sensitivity, versatile meter with sixty-eight ranges, designed around a 40 μA d.c. movement. Fitted with switch for reversing polarity. Sensitivity 20,000 ohms/V on d.c. ranges and 2000 ohms/V on a.c. ranges. Mounted in a robust plastics case with a cover and a carrying handle. Dimensions 19×16×11·5 cm, net weight 2·2 kg. Complete with leads, clips and instructions.

Ranges

d.c. voltage	13 ranges:	100 mV to 2500V
a.c. voltage	11 ranges:	1 to 2500V
d.c. current	14 ranges:	50 μA to 10A
a.c. current	11 ranges:	1 mA to 10A
resistance	5 ranges:	1 ohm to 50 megohms self-contained
capacitance†	4 ranges:	0·001 to 100 μf
inductance†	2 ranges:	0·2 to 20 H
decibels	8 ranges:	−10 to +68 dB (reference level 1 mW in 600 ohms)

Each **£25. 10. 0.** *m*

† Using adapter EE-901.

ACCESSORIES

EE-901 **Adapter,** for measuring capacitance and inductance with EE-900 ... ... Each **£8. 0. 0.** *mN*

EE-902 **Adapter,** to extend d.c. voltage range to 25 kV. Each **£5. 15. 0.** *mN*

Items on this page normally available from stock except those coded ***N.***

MULTIRANGE METERS

(continued)

EE-920

MULTIRANGE METER, *Taylor* **Model 100A,** a very high sensitivity, portable meter with thirty-five ranges, designed around an 7 µA centre pole moving coil movement. Movement protected by an automatic cut-out and fitted with a press button for reversing the movement polarity. Sensitivity 100,000 ohms/V on d.c. ranges and 5000 ohms/V on a.c. ranges. Dimensions 19×16×11·5 cm, net weight 2 kg. Complete with carrying handle, PVC covered leads, clips, prods and instructions.

	Ranges
d.c. voltage	8 ranges: 500 mV to 2500V
a.c. voltage	6 ranges: 10 to 2500V
d.c. current	7 ranges: 10 µA to 10A
resistance	4 ranges: 0 to 200 megohms self-contained
decibels	5 ranges: −10 to +62 db (reference level 1 mW in 600 ohms)
output	5 ranges: 0—10 to 0—1000V

Each **£34. 0. 0.** *m*

For illustration see EE-900 on previous page.

ACCESSORIES

EE-921	**Adapter,** to extend d.c. voltage range to 25 kV	Each **£5. 15. 0.** *m*
EE-925	**Leather carrying case**	Each **£3. 10. 0.** *m*

Taylor
Model 127A
20,000 ops DC
1,000 ops AC
2.5V DC
10V
100V
250V
10,000Ω
100Ω
1000V

EE-960

EE-960

MULTIRANGE METER, *Taylor* **Model 127A,** a pocket size 8 cm scale meter with twenty-four ranges designed around a 40 µA centre pole moving coil movement. Sensitivity 20,000 ohms/V on d.c. ranges and 1000 ohms/V on a.c. ranges. Dimensions 14·5×9×4·5 cm, net weight 400 g. Complete with leads and instructions.

	Ranges
d.c. voltage	7 ranges: 300 mV to 1000V
a.c. voltage	5 ranges: 10 to 1000V
d.c. current	4 ranges: 50 µA to 100 mA
resistance	3 ranges: 1 ohm to 20 megohms self-contained
decibels	5 ranges: −10 to +62 dB (reference level 1 mW in 600 ohms)

Each **£10. 10. 0.** *mS*

ACCESSORIES

EE-961	**Adapter** to extend d.c. voltage range to 25 kV.	Each **£5. 15. 0.** *m*
EE-966	**Leather carrying case**	Each **£2. 5. 0.** *m*

VALVE VOLTMETER see EF-550
in List No. sequence.

INSULATION TESTER

MΩ kΩ Ω
MEGGER

EE-995

EE-995

INSULATION AND CONTINUITY TESTER, *Megger* for the measurement of insulation resistances up to 200 MΩ at 500V d.c. and for circuit resistance and continuity testing in two ranges of 0–5000 kΩ at 7·5V d.c. and 0–200 Ω at 4·5V d.c. The tester is powered by 1·5V batteries which have a life of about 1 year in normal use. A control switch can be used to select the range required or the battery check position. A button situated at the centre of the range switch must be pressed before the meter records the resistance of the circuit between the test leads. When the test button is released using 500V d.c. insulation test range any charge formed in capacitive circuits is discharged through a 75 kΩ resistor. Dimensions 15×6×9·5 cm. Complete with six 1·5V batteries, test leads and leather case ... ... Each **£18. 0. 0.** *fS*

Items on this page coded *S* normally available from stock.

REFLECTING GALVANOMETERS

SCALAMP GALVANOMETERS, *PYE*

A taut suspension movement is mounted in a moulded plastics case together with a shunt, a lamp and a transformer for mains operation. A 15 cm scale with side and central zero is fitted to the front of the case.

EF-200 to EF-203

CONTROLS

Each galvanometer has a slow motion set-zero control knob. The shunt is of the constant damping, constant current Ayrton-Mather type with 6 positions giving a 1 to 1000 range of sensitivities. A shorting switch incorporated in one foot ensures the coil is short circuited and thus damped when the instrument is lifted.

DIMENSIONS 20×28×18 cm.

List No.	EF-200	EF-201	EF-202	EF-203
Coil resistance—ohms	24	110	420	1400
Period—seconds	2	2	2	2
Critical damping resistance—ohms	230	1450	7500	25,000
Sensitivity × 1 range mm/μA	17	43	95	190
μA/mm	0·056	0·023	0·011	0·0053
mm/μV	0·71	0·39	0·23	0·14
Each	**600/–**	**600/–**	**600/–**	**600/–**

f

EF-250

EF-250

GALVANOMETERS, REFLECTING AND POINTER, *Cambridge*, **pot pattern.** A very robust instrument carrying a plane mirror and a 1 metre focus lens. Scale 5–0–5 corresponding approximately to 3–0–3 μA.

Coil resistance, approx.	1000 ohms
Period (damped)	2 sec
Sensitivity at 1 metre	
mm/μA	170
mm/μV	0·17

Each **£9. 5. 0.** *fN*

EF-260

EF-260

GALVANOMETER LAMP AND SCALE, *Cambridge.* Suitable for all types of reflecting galvanometers, with a matt transparent scale numbered 25–0–25 and 0–50 cm mounted on heavy base with vertical and horizontal adjustment. Optical projector is universally adjustable and fitted with hairline and pointer. A transformer with tappings for 200/250V a.c. mains housed in the base operates a 4V 8W gas filled bulb ... Each **£15. 0. 0.** *fN*

Items on this page normally available from stock except those coded *N*.

EF-390

EF-410
EF-415

EF-421

RESISTANCE BRIDGES

EF-390

WHEATSTONE BRIDGE, Post-Office Pattern, with series arm containing 16 coils having values from 1 ohm to 5000 ohms in the series 1, 2, 2, 5, giving a total resistance of 11,110 ohms. Accuracy of adjustment of each coil to ±0·2%. The ratio arms of 10, 100 and 1000 ohms have an accuracy of ±0·1%. The bakelite top panel is engraved with the value of each resistance and contains the sockets, interchangeable spring loaded plugs, tapping keys and 4 mm terminals. Complete in hardwood case with hinged lid ... ... Each **£29. 19. 6.** *mN*

EF-410

WHEATSTONE BRIDGE, *Pye,* **4-decade pattern,** with total range of 0·001 ohm to 10 megohms. This portable bridge consists of two ratio arms with steps of 10, 100 and 1000, and a variable arm of four decades in steps of thousands, hundreds, tens and units of ohms. Complete with low resistance switches clearly showing the figures against a contrasting background and a built-in pointer galvanometer which may be by-passed when using an external reflecting galvanometer for greater accuracy. Dimensions 46×19×18 cm... ... Each **£90. 0. 0.** *fN*

EF-415

WHEATSTONE BRIDGE, *Pye,* **4-decade pattern,** as EF-410 but with total range of 0·0001 ohm to 1 megohm. The decade variable arm has steps of hundreds, tens, units and tenths of ohms ... ... Each **£90. 0. 0.** *fN*

For suitable **reflecting galvanometers** for use with EF-410 and EF-415 see EF-201.

PLUG-PATTERN RESISTANCE BOXES

A series of educational type resistance boxes in semi-polished hardwood cases. The spring loaded plugs engage in brass inserts mounted on a bakelite panel. All the bobbins are wound non-inductively with a very low temperature coefficient wire and are all aged and varnish impregnated. The coils are rated at 1W and the accuracy is adjusted to ±0·1% for values of 1 ohm and above, and to ±0·2% for values below 1 ohm. The insulated terminals have 4 mm sockets.

List No.	Total resistance	Steps	No. of plugs	Each	
EF-420	11 ohms	0·1 ohms	8	**£8. 17. 6.**	*m*
EF-421	110 ,,	1·0 ,,	8	**£9. 5. 0.**	*m*
EF-422	111 ,,	0·1 ,,	12	**£12. 5. 0.**	*m*
EF-423	1110 ,,	1·0 ,,	12	**£13. 17. 6.**	*m*
EF-424	11,110 ,,	1·0 ,,	16	**£17. 18. 6.**	*m*

Items on this page normally available from stock except those coded *N.*

DECADE RESISTANCE BOXES

These decade resistance boxes are suitable for many educational and industrial laboratory purposes where a high degree of accuracy is not necessary. They are robustly constructed in stove enamelled steel cases fitted with rubber feet. The rotary switches have double rubbing contacts with click-stop mechanism and the resistances have an accuracy of ±1%. Terminals are captive head insulated type with socket, the centre (black) terminal being connected to the casing for earthing purposes.

Maximum current: Units decade 700 mA. Tens decade 140 mA. Hundreds decade 43 mA. Thousands decade 14 mA. Tenthousands decade 4·3 mA.

EF-430
RESISTANCE BOX, low decade pattern, as above specification, with 3 decades for units, tens and hundreds with total resistance of 999 ohms in steps of 1 ohm.
Each **£10. 0. 0.** *fS*

RESISTANCE
TOLERANCE

EF-432

EF-432
RESISTANCE BOX, medium decade pattern, as above specification, with 3 decades for hundreds, thousands and tenthousands with total resistance of 99,900 ohms in steps of 100 ohms ... Each **£10. 0. 0.** *fS*

FLEXIBLE CONNECTING CABLES with stackable 4 mm plug ends suitable for use with above, see EB-940 in List No. sequence.

The *Pye* range of accuracy decade resistance boxes is suitable for industrial and educational work with d.c. and audio frequencies. Each box has four decades from the range shown in table below.

RESISTORS

The resistors of each decade are constructed from carefully aged and heat treated manganin wire and have low thermal e.m.f. and low reactance qualities. The accuracy of the decades is ±0·02% except the 'tenths' decades which are ±0·2%.

SWITCHES

Resistors are selected by an eleven position (including zero) switch with a click-stop mechanism. Each switch has a very low contact resistance and is self lubricating giving long life without attention. The appropriate figures clearly show against a contrasting background facilitating rapid and easy reading.

CONSTRUCTION

The decades are mounted in a stove enamelled steel case, fitted with feet.

Decade ohms	Maximum current A
10×0·1	2·0
10×1	0·7
10×10	0·2
10×100	0·07
10×1,000	0·02

EF-450

EF-450
RESISTANCE BOX, *Pye,* **4-decade pattern,** as specification, with total resistance of 1111 ohms in steps of 0·1 ohm, comprising hundreds, tens, units and tenths.
Eacg **£44. 0. 0.** *f*

EF-455
RESISTANCE BOX, *Pye,* **4-decade pattern,** as specification, with total resistance of 11,110 ohms in steps of 1 ohm, comprising thousands, hundreds, tens and units ... ... Each **£47. 0. 0.** *f*

EF-465
RESISTANCE BOX, *Pye,* **5-decade pattern,** as specification, with total resistance of 11,111 ohms in steps of 0·1 ohms, comprising thousands, hundreds, tens, units and tenths ... ... Each **£56. 0. 0.** *f*

Items on this page coded *S* normally available from stock.

EF-480

EF-490

EF-492

EF-530

EF-550

WESTON CADMIUM CELLS

EF-480

STANDARD WESTON CELL, *Cambridge.* A saturated type H cell producing e.m.f. of 1·0186V with temperature coefficient −40μV per °C rise between 15° and 25°C. Complete with thermometer in case 10 cm dia. 13 cm high ... ... Each **£8. 5. 0.** *f*

EF-485

STANDARD WESTON CELL, *Cambridge*, as EF-480 but with two cells mounted together for cross-checking e.m.f. accuracy ... ... Each **£12. 5. 0.** *fN*

MERCURY CELLS

Mallory cells provide an extremely stable d.c. reference voltage for calibration purposes and offer advantages over the Weston cell that they are far more robust and can provide a small source of d.c. current without damage. The e.m.f. of 1·35V remains constant within 1% from −20° to +70°C and for short period comparisons is stable within one part in a million. Supplied in sealed metal case with insulated terminals.

Detailed pamphlet on application.

EF-490

VOLTAGE REFERENCE BATTERY, *Mallory*, **single cell, 1·35V.** Size 63×40×95 mm, in carrying case. Each **£6. 9. 0.** *f*

EF-492

VOLTAGE REFERENCE BATTERY, *Mallory*, **multi-cell,** containing eight cells, total e.m.f. 10·80V. Size 165×27×90 mm, in carrying case... Each **£12. 8. 0.** *f*

EF-530

CAPACITANCE BOX, decade pattern for educational and industrial laboratory purposes where a high degree of accuracy is not required. Robust construction in enamelled steel case with earthing terminal.

Ranges:	0 to 0·001, 0·01 and 0·1 μF
Maximum voltage	750V d.c.
Accuracy:	± 1% below 0·11 μF ± 5% at and above 0·11 μF
Dimensions:	18×9×9 cm.

Each **£12. 14. 0.** *f*

EF-550

VALVE VOLTMETER, *Taylor* **Model 172A,** a stable, sensitive electronic test meter with a wide frequency range and very high input impedance. It is designed to cover a wide range of resistance and can also be used as a direct reading output meter. F.M. facility is provided with centre zero for the F.M. discriminator circuit.

Ranges	d.c. voltage	7 ranges from 0–1·5V to 0–1500V with polarity reversing switch.
	a.c. voltage R.M.S.	7 ranges from 0–1·5V to 0–1500V 30 Hz to 3 MHz.
	a.c. voltage peak to peak	7 ranges 0·4V to 0–4200V.
	Resistance	7 ranges from 10³ to 10⁶ ohms.
	Input impedance	d.c. ranges 11 MΩ. a.c. 1·5–150V 130 KΩ + 18 pF to 1500V 1·5 MΩ + 45 pF.
Accuracy		d.c. 3%, a.c. 3% of full scale deflection.
Power supply		110–240V, 40/60 Hz. Consumption 25W.
Dimensions		19×16×11·5 cm.

Each **£28. 0. 0.** *fN*

Items on this page normally available from stock except those coded *N.*

POTENTIOMETERS

EF-600

POTENTIOMETER, *Pye,* **Model S,** a general purpose potentiometer, particularly suitable for students' use, reading directly in volts and millivolts with a range from 0 to 1·8V in steps of 1 mV. The circular slide wire, divided into 200 parts, has a range of 200 mV. The instrument is fitted with manganin coils and incorporates fine and coarse rheostats for accurate current adjustment. Standardisation can be carried out without disturbing the dial settings. Accuracy is ± 0·1% or ± ½ scale division whichever is greater. Mounted in metal case on the base of which the circuit diagram is printed. Dimensions 23×17×8 cm, weight 1·7 kg ... Each **£30. 0. 0.** *f*

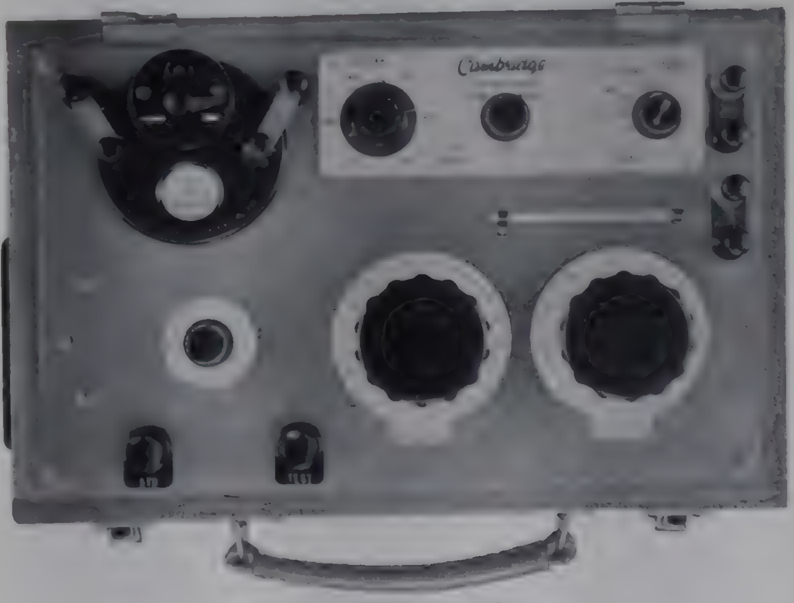
For suitable galvanometer for use with EF-600, see EF-200 et seq.

EF-600

EF-610

EF-610

POTENTIOMETER, *Pye,* portable, with range 0 to 1·8V in steps of 1 mV. An entirely self-contained, precision potentiometer incorporating a circular slide wire, a standard cell and a robust taut suspension pointer galvanometer. Provision is made for using an external galvanometer. With multipliers of 0·1 and 0·01 converting each scale division into 100 μV and 10 μV respectively. Standardisation can be carried out without disturbing the dial settings. Accuracy better than ± 0·1% or 1 division whichever is greater. Dimensions 29×22×16 cm, weight 5 kg ... Each **£80. 0. 0.** *f*



EF-628 without lid

EF-628

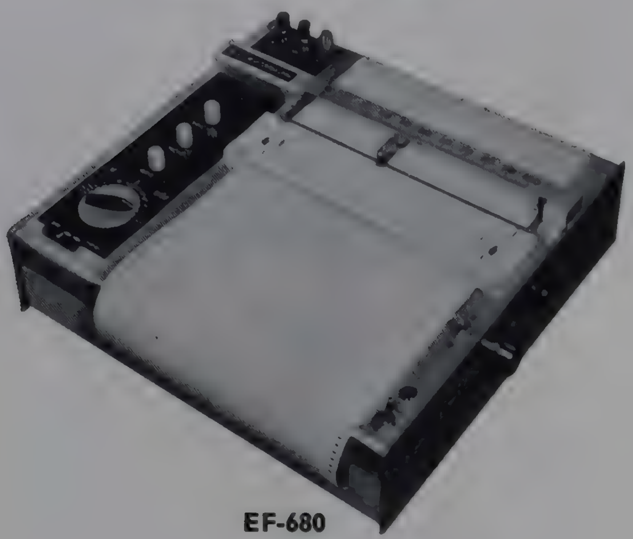
POTENTIOMETER, *Cambridge,* **multi-purpose,** range 0·01 to 101 mV d.c. A main potential dial with 100 click-stop steps of 1 mV each is supplemented with a fine potential slide wire dial from −0·05 mV to + 1·05 mV divided in 0·01 mV. Accuracy is ± 0·1% or ±½ scale division, whichever is the greater. This completely self-contained instrument is particularly useful for checking the calibration of thermocouples and associated indicating and control instruments. It has a built-in galvanometer and standard cell and the case provides a compartment for batteries (1·3 to 1·5V required, *Mallory* RM42R recommended). Dimensions 36×26×18 cm, weight 6 kg. Each **£93. 10. 0.** *f*

All items on this page normally available from stock.

SELF-BALANCING D.C. POTENTIOMETRIC STRIP CHART RECORDERS

Owing to the many ranges and accessories now available for strip chart recorders, it is not practicable to catalogue a comprehensive range. The two instruments listed below are selected as versatile recorders suitable for a very wide range of applications and offering the best modern features. We shall be pleased to quote for other models on receipt of requirements.

SERVOSCRIBE



EF-680

- Suitable for e.m.f. and thermocouple measurements
- Six chart speeds selected by rotary switch
- Reversible paper drive
- Range expansion as standard feature
- Input voltage can be suppressed
- Zero setting continuously variable
- Can be used with chart horizontal or vertical
- Perspex tear-off chart ruler as standard feature
- Record on perforated chart rolls or standard graph sheets size A4

OPERATION

The instrument comprises a potentiometer network supplied from a Zener reference voltage unit. The difference between the reference voltage and the voltage to be measured is fed to a chopper amplifier which operates a servo motor until both voltages are equal.

OPTIONAL EXTRAS are available including
- event marking when using perforated chart rolls (working voltage must be specified)
- margin ruler
- protective case

Details on application

TECHNICAL DATA

Scale width	20 cm (8 in) nominal
Record	single point continuous
Minimum f.s.d.	2 mV
Pen traverse	maximum 1·5 sec, normally 1 sec
Chart speeds	3 to 3600 cm per hour in 6 fixed steps
Mains input	110/120 or 200/240V 50 Hz
Zero suppression	0—100% of any fixed range
Scale expansion	40—100% of any fixed range can be expanded to full scale
Overall dimensions	36 × 35 × 10 cm
Weight	8 kg approx.

EF-680

STRIP CHART RECORDER, *Smiths Servoscribe*, as specified, without optional extras. For 110/120 and 200/240V, 50 Hz supplies only ... Each **£270. 0. 0.** *f*

REPLACEMENT PARTS

EF-682	**Roll of chart paper**	Each **£0. 15. 0.** *f*
EF-684	**Pad of 50 sheets of A4 (210—297 mm) graph paper.**	Each **£0. 8. 6.** *m*

SPEEDOMAX W

EF-690

- Suitable for e.m.f. and thermocouple measurements
- Simple plug-in range chart facilities
- Wide range of chart speeds
- Adjustable offset zero module available
- Optional control slidewire or control contacts
- Input failsafe as standard feature
- Can be rack or bench mounted

OPERATION

The instrument is an automatically balanced d.c. recording potentiometer with the measuring circuit current supplied by an a.c. line rectifier and regulated by a Zener diode circuit. For thermocouple applications, reference junction compensation is automatic.

OPTIONAL CONTROL FORMS available are:—
- adjustable zero, adjustable range (AZAR)
- on/off control when fitted with contacts
- proportional control through a series 60 control unit when fitted with slidewire
- position-adjusting type (P.A.T.)
- duration-adjusting type (D.A.T.)
- current-adjusting type (C.A.T.)

Option extras include dual chart speeds, fluorescent scale and chart illumination, tilting chart table, amplifier failsafe and bench mounting plinth. Details on application.

TECHNICAL DATA

Scale width	25 cm (10 in) nominal
Record	single point continuous
Minimum f.s.d.	1 mV (except AZAR)
Pen traverse	5 sec or 1 sec nominal as specified
Chart speeds	single speed in range 1·0 to 1800 in/hr
Mains input	240V, 50 Hz
Overall dimensions	38 × 30·5 × 30·5 cm
Weight	17 kg approx.

EF-690

STRIP CHART RECORDER, *Leeds and Northrup Speedomax* **type W,** as specified, without optional control forms or optional extras. 1 sec f.s.d., chart speed 12 in/hr. For 240V 50 Hz supplies only ... Each **£223. 0. 0.** *f*

ACCESSORY

EF-692	**Plinth, for mounting EF-690 on bench.**	Each **£15. 0. 0.** *f*

REPLACEMENT PART

EF-694	**Chart roll, scaled 0—100 arbitrary units, 25 metres long.**	Each **£0. 18. 6.** *f*

OSCILLOSCOPES

EF-925

OSCILLOSCOPE. A compact portable instrument with built-in 'Y' amplifier with adjustable gain and time base for the full range of audio and lower ultrasonic frequencies. The time base which has 3 stepped speed ranges and a variable control with a 10 : 1 speed range is automatically triggered so that the display is fully synchronised at all frequencies. Provision is made for an external 'X' input for the display of Lissajous figures or for an external time base. *The oscilloscope is suitable for the Nuffield Science Teaching Project course.*

Technical Data

Tube	7 cm diameter with green filter engraved with 10×10 division graticule and focus and brilliance controls
'Y' input	Bandwidth: d.c. to 30 KHz (—3 db) Sensitivity: better than 100 mV/division Maximum input: 140V r.m.s. Impedance: 1 MΩ in parallel with 30 pF Vertical shift: 1 screen diameter
'X' input	Bandwidth: 3 Hz to 200 KHz Sensitivity: 8V r.m.s./division
Time base	Speeds: Range 1— 1 sec to 100 ms f.s.d. Range 2—100 ms to 10 ms f.s.d. Range 3— 10 ms to 1 ms f.s.d. Synchronisation: Automatic at all speeds Flyback: Fully blacked out
Dimensions	19×14×25 cm
Weight	4 kg

With tapped mains transformer for 110/125V and 210/250V, 50/60 Hz single phase supplies.

Each **£23. 10. 0.** *f*

EF-925

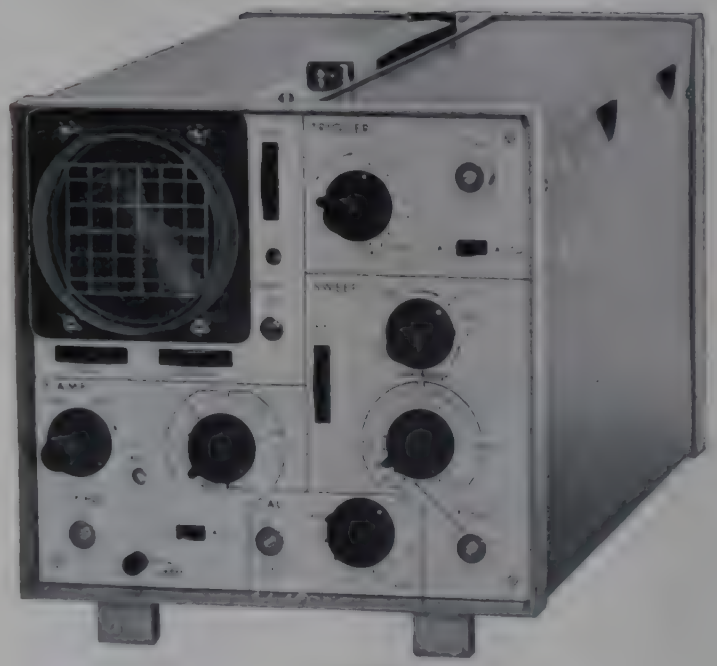
EF-940

OSCILLOSCOPE, *EMI,* **Type 101.** A compact solid state single beam oscilloscope with a comprehensive specification which makes it suitable for use in physical, chemical and electronics laboratories.

The tube has a 6×5 cm graticule and adjustments for focus, brilliance and astigmatism.

The wide bandwidth 'Y' amplifier has 9 input ranges, an adjustable 'shift' control, a 3 : 1 'gain' control with integral calibration switch and a selector switch for a.c. or d.c. inputs. Eight internal calibration voltages or an external calibration input can be selected by using the 'calibration' control. Any of 18 time base speeds or an external 'X' input can be selected by means of a single control. 'X' shift and 5 : 1 sweep expansion controls also are built in. Internal or external triggering may be used and a 'level' control enables the precise point of origin of a waveform to be adjusted.

Easy access printed circuit construction simplifies servicing and internal adjustments.



EF-940

Technical Data

Tube	7·5 cm diameter, high resolution, flat screen
'Y' input	Bandwidth: d.c. or 3 Hz to 15 MHz (—3 db) Sensitivity: 50, 100, 200 and 500 mV/cm 1, 2, 5, 10 and 20V/cm Maximum input: 500V d.c. or d.c. +a.c. peak Impedance: 1 MΩ in parallel with 28 pF Vertical shift: 15 cm
'X' input	Bandwidth: d.c. to 4 MHz (—3 db) at × 1 Sensitivity: 1·5V/cm at × 1 Impedance: 2000Ω Horizontal shift: 18 cm
Time base	Speeds: 0·2, 0·5, 1, 2, 5, 10, 20, 50, 100, 200 and 500 μs/cm 1, 2, 5, 10, 20, 50 and 100 ms/cm
Triggering	Internal: + or — External: + or —, attenuated 20 : 1 + or - Mode: Auto or a.c. (level control operative) Level control ±2·5 cm or ±2·5V and ±50V external Sensitivity: 0·2 cm internal or 0·2V external Bandwidth: 5 Hz to 15 MHz Input impedance: 1MΩ in parallel with 25 pF (5 pF with 20 : 1 attenuation)
Dimensions	23×22×28 cm
Weight	8 kg
Ambient temperature	—5 to 40°C

For power supplies 95/130V and 190/260V, 50/60 Hz single phase and 12V (11/14V) d.c. supplies.

Each **£170. 0. 0.** *f*

SIGNAL GENERATORS

EF-950

SIGNAL GENERATOR, *Taylor* **Model 68A,** a very wide range oscillator with a five section fully screened attenuator and a non-inductive potentiometer ensuring accurate attentuation over whole frequency range.

MODULATION
R.F. OUTPUT
SIGNAL GENERATOR
Taylor
MODEL 68A
ATTENUATOR

EF-950

Technical Data

Frequency range on fundamentals	100 kHz to 240 MHz in eight bands. Scale length 150 cm.
Calibration accuracy	± 1%.
R.F. Output	100 mV up to 100 MHz.
Leakage	Negligible.
Attenuation	Coarse: 5 steps of —20dB. Fine: variable to zero approx.
A.F. Output	Direct connectors to A.F. output, level 1V maximum is provided.
Modulation	400 Hz sine wave, 30% depth.
Output impedance	75 ohms approx. via co-axial lead.
Power supply	100/120 or 200/250V, 40/60 Hz Consumption 12W approx.
Dimensions	23 × 33 × 20 cm.
Weight	8·2 kg.

Each **£32. 0. 0.** *m*

When ordering please state voltage and nature of supply.

EF-960

SIGNAL GENERATOR, *Taylor* **Model 192A,** for generating sine and square waves of good wave-form over a frequency range of 10 Hz to 100 kHz. This oscillator provides a convenient source of low power voltage for frequency checks. The circuit is stabilised to provide a constant output at all frequencies.

TAYLOR ELECTRICAL INSTRUMENTS LTD SLOUGH ENGLAND
C/S
RANGE
WAVEFORM
ATTENUATOR
COARSE
FINE
Taylor
Model 192A
L.F. OSCILLATOR

EF-960

Technical Data

Frequency ranges	10 Hz to 100 Hz, 100 Hz to 1000 Hz, 1 kHz to 10 kHz, 10 kHz to 100 kHz.
Accuracy	± 1% 10 Hz to 10 kHz ± 2% 10 kHz to 100 kHz.
Output	Sine wave: Maximum output not less than 25V r.m.s. into open circuit. Square wave: Maximum output not less than 30V p.p. into open circuit.
Distortion	Distortion factor on sine wave: Better than 1% at, 1000 Hz. Square wave rise time 3 microseconds.
Output impedance	10 KΩ approximately.
Attenuation	Coarse: Four position switch 25V, 2·5V, 250 mV and 25 mV r.m.s. Fine: Constantly variable calibrated 0 to 25V.
Power supply	110/250V, 40/60 Hz. Consumption 12W approx.
Dimensions	32 × 22 × 19 cm.
Weight, approx.	6·4 kg.

Each **£36. 10. 0.** *f*

CONDUCTIVITY BRIDGES

PORTABLE CONDUCTIVITY BRIDGES

Two transistorised, battery operated instruments for testing water samples from boiler systems, condensers, rivers etc., and for measuring concentrations of electrolytes in solution. Measurement is by an a.c. bridge, energised at low potential by a 1000 Hz oscillator. The combination of low potential and high frequency obviates errors due to polarisation within the conductivity cell. Using the cells provided, measurement is possible over the stated ranges in three switched steps. The range selector switch also has a test position at which the bridge calibration can be checked.

EJ-055

CONDUCTIVITY BRIDGE, *Electronic Switchgear,* **Type MC3, range 1 to 100,000 micromhos/cm,** as specification. A beaker type cell, which has a constant K=1·0 and a sample volume of approximately 12 ml, plugs into the side of the bridge. Complete with one cell CJ/10, cell cleaning brush, thermometer 0–50°C and plastics carrying case. With *Ever Ready* Type PP4 battery.

Overall dimensions 24 × 19 × 9 cm

Total weight 2·3 kg ... Each **£42. 0. 0.** *m*

REPLACEMENT PARTS

EJ-057	**Cell,** Type CJ/10, K=1·0	Each **£8. 0. 0.**	*f*
EJ-058	**Thermometer,** 0–50°C, without case.	Each **£0. 12. 6.**	*f*
EJ-059	**Carrying case,** plastics	Each **£1. 17. 6.**	*f*

EJ-060

CONDUCTIVITY BRIDGE, *Electronic Switchgear,* **Type MC-1 Mark IV, range 0·1 to 100,000 micromhos/cm** as specification. Includes two conductivity cells EJ-084 having constants of 0·1 and 1·0 respectively. Temperature compensation facilities for dilute aqueous solutions (coeff 2% per deg C) are provided over the range 10 to 10,000 μmhos/cm. Outside this range or for other solutions the compensation coefficient can be calculated from measurements made at two different temperatures. Complete with thermometer 0–50°C in brass case, cell cleaning brush, and instructions. With *Ever Ready* Type PP7 battery. **Without carrying case.**

Overall dimensions 32 × 22 × 12 cm

Total weight 3·6 kg ... Each **£77. 0. 0.** *m*

REPLACEMENT PARTS AND ACCESSORY

EJ-068	**Thermometer,** 0–50°C in brass case.	Each **£1. 1. 0.**	*f*
EJ-069	**Carrying case,** canvas	Each **£1. 5. 0.**	*f*
EJ-084	**Cells,** Type CB. For price see entry in List No. sequence.		

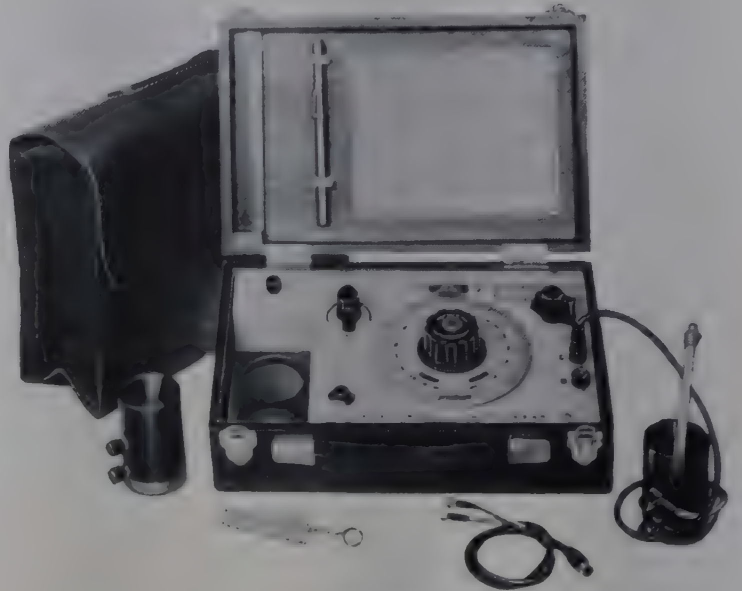
EJ-080

CONDUCTIVITY CELLS, type CCL, pipette type with rubber bulb. For prices see below.

EJ-081

CONDUCTIVITY CELL, type CEA, flow line type, ½ in bore with ½ in B.S.P. thread. For max. 100°C and 100 lb/in² working, or use as a beaker with end fittings provided.

Cell constant K		0·1	1·0	
EJ-080	Each	**£13. 0. 0.**	**£12. 0. 0.**	*f*
EJ-081	Each	**£11. 7. 0.**	**£11. 7. 0.**	*f*



EJ-060

EJ-084

CONDUCTIVITY CELL, type CB, general purpose beaker type. The cell has a funnel shaped entry to facilitate insertion of sample so that it is equally suitable for use with liquid sludges, wet soil samples and other similar materials. A removable base plug facilitates thorough cleaning. Sample volume approx. 12 ml.

Cell constant K	0·1	1·0	
Each	**£10. 0. 0.**	**£10. 0. 0.**	*f*

When ordering any of above cells please specify constant required.

EJ-086

CONDUCTIVITY CELLS, uncalibrated, *Gallenkamp.* Borosilicate glass cells with bright platinum disk electrodes supported by ebonite covers.

Conductivity range	Electrodes		Each	
	Dia., mm	Distance apart, mm		
High	11	10·5	**£8. 0. 0.**	*a*
Medium	15	7	**£11. 0. 0.**	
Low	22	3·5	**£17. 10. 0.**	

EJ-086

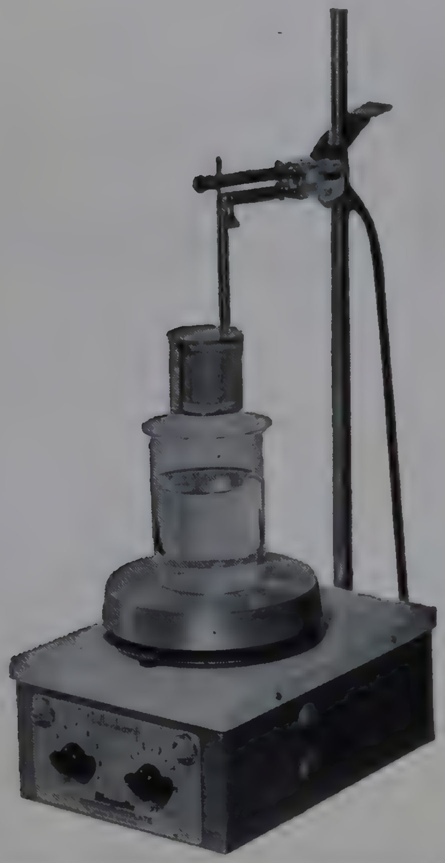
Conductivity meter, *Dionic,* for water testing see WP-740 in List No. sequence.

Conductivity bridge, for soil testing see SH-120 in List No. sequence.

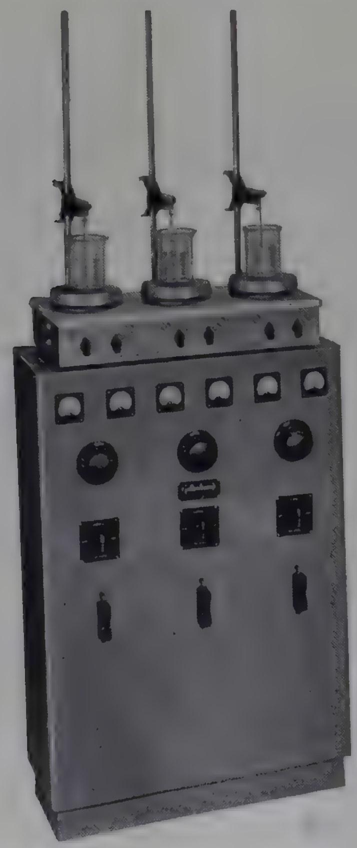
All items on this page normally available from stock.

Gallenkamp ELECTRODEPOSITION ANALYSERS

with stationary electrodes and magnetic stirring for the estimation of any metal which can be determined gravimetrically after electrodeposition.



EJ-090 single test Analyser with electrodes EJ-100 and EJ-101



EJ-090 three test Analyser with power supply unit EJ-095

The electrodeposition analyser is made in two forms, a single and a three test unit, both of which have built-in magnetic stirrers and hotplates. The use of magnetic stirring in electrodeposition analysers has many advantages. Increased efficiency of agitation enables the copper to be deposited in two-thirds of the time compared with conventional apparatus, the space above the apparatus is left clear for the electrode holders, and spray during agitation is reduced to a minimum.

ANALYSER

The 1-test analyser is bench mounted but the multiple analyser for 3 tests is designed to stand on the corresponding power supply unit. The analyser base is of rustproofed steel, finished in grey enamel. Inside this base are fitted the magnetic stirrer, speed control and energy regulator for the 12·5 cm diameter hotplate which is supported on the top of the base. The electrode holders, which are adjustable for height, are fitted on stainless steel rods at the rear of the analyser.

POWER SUPPLY UNIT

This comprises selenium full wave rectifiers and a double wound transformer in a ventilated metal case finished in stoved enamel. An ammeter and voltmeter are fitted in each circuit together with mains fuses and switch, and a variable resistance. Output from each circuit is 7A at 12V.

EJ-090

ELECTRODEPOSITION ANALYSERS, *Gallenkamp*, as specification, comprising stirrer/hotplates with speed controls, energy regulators, electrode support rods and holders. **Without d.c. power supply unit, beakers or electrodes.** For single phase supplies.

		1-test	3-test	
Base dimensions		23 × 16	23 × 52 cm	
For 220/240V 50 Hz	Each	**£28.10. 0.**	**£86. 0. 0.**	*b*
For 200/210V 50 Hz	Each	**£28.10. 0.**	**£86. 0. 0.**	*bN*
For 110/120V 60 Hz	Each	**£29. 0. 0.**	**£86.10. 0.**	*bN*

When ordering please state voltage and nature of supply

REPLACEMENT PARTS

EJ-092	**Electrode holder,** plastics and stainless steel, complete with cable connection	Each	**£5.10. 0.**	*b*
SS-636	**Magnetic followers,** polypropylene, 25 mm and 45 mm. For prices see entries in List No. sequence.			

EJ-095

POWER SUPPLY UNIT, *Gallenkamp*, as specification, with ammeter, voltmeter and rheostat and with output of 7A at 12V from each circuit. For single phase supplies.

		1-test	3-test	
Dimensions		45 × 30 × 23	83 × 60 × 35 cm	
For 200/250V 50 Hz	Each	**£53.10. 0.**	**£145. 0. 0.**	*g*
For 110/120V 60 Hz	Each	**£54.10. 0.**	**£151.10. 0.**	*gN*

When ordering please state voltage and nature of supply.

EJ-100

INNER ELECTRODE, anode, platinum gauze cylinder, 32 × 32 × 140 mm overall height ... Each **£56. 0. 0.** *m*

EJ-101

OUTER ELECTRODE, cathode, platinum gauze cylinder, 45 × 45 × 125 mm overall height.
Each **£80. 0. 0.** *m*

ACCESSORIES

BJ-655	**Beaker,** 250 ml, squat form. For price see entry in List No. sequence.	
EJ-105	**Beaker cover,** polythene, with slot to allow for entry of electrodes. Strongly recommended since it prevents the loss of solution from spray. Dozen £3. 8. 0. Each £0. 6.10.	*b*

Items on this page normally available from stock except those coded *N*.

DETERMINATION OF HYDROGEN ION CONCENTRATION (pH)

SUMMARY OF pH METERS LISTED ON THE FOLLOWING PAGES

page
EJ-300 *Analytical* pocket 239
EJ-312 *Analytical* 'big scale' 240
EJ-322 *Analytical* redox-pH 240
EJ-330 *Analytical* recording 241
EJ-340 *Analytical* controller 241
EJ-380 *Cambridge* pocket 242
EJ-460 *E.I.L.* portable model 30C 242
EJ-515 *E.I.L.* model 23A 243
E.I.L. electrodes 243
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EJ-665 *Pye* portable 245
EJ-672 *Pye* model 78 246
EJ-682 *Pye* model 79 246
Pye electrodes 247
EJ-780 *Pye* autotitrator-controller 247

EJ-270

BUFFER TABLETS, for standardisation of pH meters. Supplied in bottles of 50 tablets, each tablet to be made up to 100 ml with distilled water.

pH value at 20°C	4·0	7·0	9·2
Bottle of 50 tablets	**30/–**	**21/6**	**16/6** *m*

pH METERS

POCKET pH METER

A light weight accurate instrument for 'on the spot' pH measurement. Immediately ready for use with no warming up period. Push-button check for battery and electrode condition. Contains sealed electrometer tube for protection in high humidity atmosphere, and both instrument and electrode system are electrostatically shielded.

TECHNICAL DATA

Ranges pH	2 – 12 (or other 10 pH units on request). Simple manipulation extends this to 0 – 14
Scale length	6 cm
divisions	0·2 pH
Discrimination	better than 0·1 pH
Accuracy	better than 0·1 pH
Temperature correction	0 – 100°C by conversion chart supplied
Power	one each H.T. and L.T. battery providing 1000 and 300 hours running respectively
Size	7·5 × 15 × 6 cm
Weight	1 kg with carrying case and accessories

EJ-300

EJ-300

POCKET pH METER, *Analytical Measurements*, as specification, complete with pH probe unit, buffer and KCl kit, carrying case with combination hand and shoulder strap, and batteries ... ... Each **£39.18. 0.** *f*

REPLACEMENT PARTS

EJ-305	Cell, L.T., 1·35V, *Mallory* type RM12R.	Each	£0. 8. 0.	*f*
EJ-306	Battery, H.T., 0–3–13·5V ...	Each	£1. 5. 0.	*f*

All items on this page normally available from stock.

'BIG SCALE' pH METER, MODEL 700

EJ-312

A rugged, reliable instrument with a large clear scale and anti-parallax mirror inset. High accuracy and stability are combined with extreme operational simplicity. Fitted with output terminals for connecting to a recorder.

TECHNICAL DATA

Range pH	0 – 14
Scale length	18 cm
divisions	0·1 pH
Discrimination	0·02 pH
Accuracy	0·02 pH
Temperature compensation	0 – 100°C by conversion chart
Size	19·5 × 16 × 9 cm
Weight	2·3 kg

EJ-312

'BIG SCALE' pH METER, *Analytical Measurements*, as specification, complete with pH probe unit, buffer and KCl kit. For 230/250V, 50/60 Hz supplies.

Each **£54. 0. 0.** *f*

When ordering please state voltage and nature of supply.

pH meter EJ-312 is available with manual temperature compensation. Details on application.

REDOX-pH METER

EJ-322

A rugged, reliable instrument with a large clear pH/mV scale and anti-parallax mirror insert. High accuracy and stability are combined with simple operation. Change-over from pH to redox potentials is by means of a function switch. A further switch provides polarising current to the redox probe for Karl Fischer titrations. Fitted with output terminals for connecting to a recorder.

TECHNICAL DATA

Ranges pH	0 – 14 continuous
mV	±1400 continuous
Scale length	18 cm
divisions	0·1 pH, 10 mV
Discrimination	0·05 pH, 5 mV
Accuracy	0·05 pH, 3 mV
Temperature compensation	0 – 100°C by manual setting
Size	19·5 × 17 × 9 cm
Weight	2·8 kg

EJ-322

REDOX-pH METER, *Analytical Measurements*, as specification, complete with pH and Redox probe units, buffer and KCl kit. For 230/250V, 50/60 Hz supplies.

Each **£79. 4. 0.** *fN*

When ordering please state voltage and nature of supply.

NOTE: Details of the expanded scale Redox-pH meter will be supplied on request.

Items on this page normally available from stock except those coded *N*.

RECORDING pH METER

This moderately priced integrated pH meter and strip chart recorder-indicator is a lightweight instrument combining good stability and accuracy with simplicity. Record is made on a $2\frac{1}{4}$ in pressure sensitive chart for which no ink is required. Single chart lasts 30 days at 1 inch/hr. Supplied ready for both bench and panel mounting.

Technical Data

Range pH	2 – 12 (simple adjustments extends to 0 – 14)
Scale length	6 cm
divisions	0·2 pH
Discrimination	0·1 pH
Accuracy	0·1 pH
Temperature compensation	0 – 100°C by manual setting
Size	21 × 9 × 14 cm
Weight	3·5 kg

EJ-330

EJ-330

RECORDING pH METER, *Analytical Measurements,* as specification, complete with pH probe unit fitted with 180 cm cable, buffer and KCl kit. For 230/250V 50 Hz supplies only ... ... Each **£110. 0. 0.** *f*

NOTE: Special models can be supplied for other voltages and frequencies. **Please specify when ordering.**

ACCESSORIES

EJ-334	**Stripchart, scaled time and pH for standard 2–12 pH and 1 inch/hr ... ...**	**Dozen rolls £10. 0. 0.** **Roll £0. 18. 0.**	*f*
EJ-335	**Stripchart, scaled time only for standard 1 inch/hr.**	**Dozen rolls £10. 0. 0.** **Roll £0. 18. 0.**	*f*
EJ-336	**Stripchart, plain ... ...**	**Dozen rolls £10. 0. 0.** **Roll £0. 18. 0.**	*f*

TRANSISTORISED pH CONTROL UNIT

A bench or panel mounting accessory which may be used in **conjunction with a pH meter** to provide remote indication of pH and to control or alarm in the event of either a rise or fall of pH. The intrinsic accuracy of the controller is 0·05 pH and a change of this magnitude will operate the action relay.

Technical Data

Range pH	2 – 12
Accuracy	0·05 pH
Size	20 × 16 × 9 cm
Weight	2·8 kg

EJ-340

EJ-340

pH CONTROLLER, *Analytical Measurements,* for use with EJ-312, EJ-322, and EJ-330. For 230V 50 Hz supplies. Each **£25. 0. 0.** *f*

When ordering please state whether controller is required for acidic pH control (alkali is to be added) or alkali pH control (acid is to be added). State also voltage and nature of electrical supply.

POCKET pH METER

EJ-380

This very compact instrument is convenient for pH measurements not only in the laboratory but for industrial or out-of-doors purposes. It is entirely self-contained, being powered by four Mallory mercury cells giving a life of approximately 1000 hours. The direct reading indicator is scaled 0 – 14 pH subdivided in 0·2 and accurate within ±0·1 pH.

The instrument is supplied complete in plastics carrying case with 50 ml plastics bottles of buffer and reference cell solutions and a self-contained electrode system.

The latter comprises measuring and reference electrodes combined into a single concentric unit having a plastics cup at the end which serves to hold the standardising buffer or sample to be tested.

Dimensions

Meter only	19×10×8 cm
Complete in case	21×12×12 cm
Weight complete	1·7 kg

EJ-380

pH METER, *Cambridge* **pocket pattern,** as specification, in plastics carrying case with electrode system, bottles of reference and buffer solutions and instruction booklet which includes correction tables. Each **£38. 10. 0.** *f*

PORTABLE pH METER

pH
Portable pH meter
Model 30C
EIL

EJ-460

A battery operated instrument of high stability suitable for field and laboratory use with overlapping ranges covering 0–8 pH and 6–14 pH. Provision is made for measurement of potentials on overlapping scales covering 0–800 mV and 600–1400 mV.

The combined glass/reference electrode assembly is suitable for measurements over the range 0–14 pH and a resistance thermometer provides automatic temperature compensation over the range 0–100°C.

Technical Data

Ranges	0 to 8 pH, 6 to 14 pH 0 to 800 mV, 600 to 1400 mV
Subdivisions	0·1 pH
Discrimination	0·05 pH
Accuracy	±0·1 pH or ±10 mV
Stability	0·05 pH/day or 3 mV/day after 1 hour warm up period
Temperature compensation	0–100°C automatic
Dimensions	18·5×14×8·5 cm
Weight	1·3 kg

EJ-460

pH METER, PORTABLE, *E.I.L.* **Model 30C,** as specification, with combination electrode, resistance thermometer, *Ever Ready* battery PP9 and carrying case complete with wash bottle, beaker and buffer solution container ... ... Each **£85. 0. 0.** *f*

REPLACEMENT PARTS

EJ-464	**Combination electrode** SHDN33/C.	Each **£7. 10. 0.**	*f*
EJ-468	**Resistance thermometer** T30B ...	Each **£5. 0. 0.**	*f*

ACCESSORY

EJ-270 **Buffer tablets.** For details and prices see entry in List No. sequence.

All items on this page normally available from stock.

LABORATORY
pH METER Model 23A

A mains operated meter covering the range 0 to 14 pH readable to 0·02 pH.

DESCRIPTION

The meter is an ultra-stable d.c. amplifier with high input resistance. A voltage stabiliser smooths out line voltage fluctuations and the circuit is designed to ensure that calibrations are independent of ageing and replacement. Calibration may be checked and readjusted readily without disturbing the electrodes.

Output terminals are fitted for connection to a potentiometric recorder or a remote indicating meter or both. Scale expansion is possible by using a sensitive recorder and shunting resistors. **Details of this method and the apparatus required are available on application.**

Many different electrodes are available for mounting on an adjustable head fitted to a stand with rectangular base.

Technical Data

Range pH	0 – 14 subdivided to 0·1 pH
mV	0 – 800 subdivided to 10 mV
Accuracy	± 0·05 pH
Discrimination	± 0·02 pH
Zero drift	± 0·02 pH over 24 hours
Temperature compensation	0 – 100°C on all ranges
Dimensions	40 × 30 × 25 cm
Weight	12·7 kg

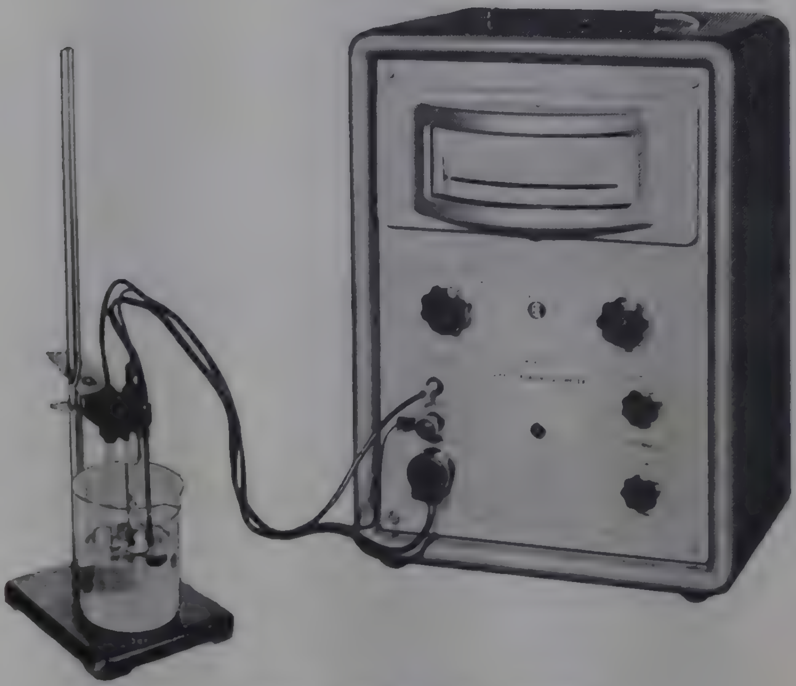
EJ-515

pH METER, *E.I.L.* **Model 23A,** as specification. For 200/250V 50/60 Hz supplies. **Without electrodes, resistance thermometer or stand.**
Each **£110. 0. 0.** *f*

Also available for 100/130V a.c. to order.

ACCESSORIES

EJ-518	**Dummy thermometer plug,** to enable the pH meter to be used without resistance thermometer. Temperature equivalent 25°C. Each **£4. 4. 0.**	*f*
EJ-519	**Dummy thermometer plug,** as EJ-518 but with temperature equivalent of 37°C. Each **£4. 4. 0.**	*f*



EJ-515 with EJ-520, EJ-522 and electrodes

EJ-520	**Resistance thermometer,** for fully automatic compensation of temperature effects. With 90 cm lead and five-pin plug. Each **£6. 0. 0.**	*f*
EJ-522	**Stand,** with adjustable head, for mounting electrodes and resistance thermometers. Each **£3. 10. 0.**	*f*
EJ-526	**Millivolt adapter,** to convert banana socket to terminal for use with metal or hydrogen electrodes ... ... Each **£0. 15. 0.**	*f*
EJ-270	**Buffer tablets,** for pH meter standardisation. For prices see entry in List No. sequence.	

ELECTRODES, *E.I.L.*, with 90 cm leads for use with pH meter EJ-515. All the glass electrodes terminate in a banana plug, whilst the reference and metal electrodes are fitted with spade terminals. See tabulation below.

Details of other ***E.I.L.*** **electrodes on application.**

List No.	Ref. No.	Type	pH range	Temp. °C	Stem dia. mm	Length cm	Character	Each	
EJ-530	GG23/B	Glass	1 – 9·5	10 – 45	10	12·5	Standard	**£2. 15. 0.**	*f*
EJ-532	GHS23/B	Glass	0 – 14	10 – 140	10	12·5	All-purpose	**£3. 0. 0.**	*f*
EJ-536	GS23/B	Glass	1 – 9·5	10 – 45	6	12·5	Spearhead	**£3. 0. 0.**	*f*
EJ-540	RJ23/1	Reference			15	15	Ceramic plug	**£3. 5. 0.**	*f*
EJ-550	EPT23	Platinum			6	12·5	Foil	**£3. 15. 0.**	*f*
EJ-552	EW23	Tungsten			6	12·5	Rod	**£6. 0. 0.**	*f*
EJ-556	ESB23	Antimony			6	12·5	Button	**£6. 0. 0.**	*f*
EJ-558	EAG23	Silver			6	12·5	Foil	**£3. 15. 0.**	*f*

All items on this page normally available from stock.

LABORATORY pH METER Model 38A

An inexpensive instrument with overlapping ranges covering 0–8 pH and 6–14 pH which avoids having to switch scales as the sample solution changes from acid to alkali or vice versa. A feature of the meter is the provision of both auto and manual temperature compensation.
The instrument covers also potential ranges from 0 to 1400 mV in the same two scales 0–800 mV and 600–1400 mV.
It is provided with a swing-out electrode clamp which is particularly convenient for titration work.

EJ-620

Technical Data

Ranges pH	0–8 and 6–14
mV	0–800 and 600–1400
Accuracy	±0·1 pH or ±10 mV
Discrimination	0·02 pH or 2 mV
Stability	0·05 pH/day or 3 mV/day after 1 hour warm up period
Input resistance	suitable for electrodes of up to 1000 MΩ
Temperature compensation	0–100°C automatic and manual
Dimensions	22×24×16 cm
Weight	3·6 kg

EJ-620

pH METER, *E.I.L.* **Model 33A,** as specification, complete with glass electrode, range 0–14 pH and reference electrode. For 100/250V 40/60 Hz supplies and 18V d.c. battery source ... ... Each **£76. 0. 0.** *f*

LABORATORY pH METER Model 46A

This instrument is designed round the *E.I.L.* Vibret vibrating capacitor modulator. The Vibret is extremely robust and simple and avoids the problems associated with an electrometer input valve. The wide scale and carefully grouped controls ensure maximum ease of operating and reading. Together with a 0–14 pH scale, a second scale of 2·8 pH is provided which can be off-set in steps of 2 pH from 0–12 pH, so expanding the scale by a factor of more than six. Both pH and redox measurements may be made with rapid changeover from the one to the other. An output socket makes continuous recording possible and also provides a means of connecting with a special 1·4 pH span expanded scale meter for measurements of the highest accuracy.

EJ-630

Technical Data

Ranges pH	0–14 pH, 0–2·8 pH with back-off in 2 pH steps
mV	0–1400 mV, 0–280 mV with back-off in 200 mV steps
Accuracy	wide range ±0·05 pH or ±5 mV narrow ranges ±0·01 pH or ±1 mV
Stability	about 0·005 pH or 0·25 mV/day
Input resistance	suitable for electrodes of up to 1000 MΩ
Temperature compensation	fully automatic 0–100°C for zero and slope
Recorder output	1·4 mA into 5 kΩ
Dimensions	36×26×21 cm
Weight	6·8 kg

EJ-630

pH METER, *E.I.L.* **Vibret Model 46A,** as specification, complete with glass electrode, range 0–14 pH and reference electrode and dust cover. For 100/120 or 200/250V 50 Hz supplies ... ... Each **£193. 15. 0.** *fN*

(Model for 60 Hz supplies available to special order).

When ordering please state voltage and nature of supply.

Items on this page normally available from stock except those coded *N*.

LABORATORY pH METER Model 290

Design

A sensitive and very rugged pH meter, with a wide scale meter and having normal and expanded ranges and temperature compensation. The input stage is a very high input impedance light modulated circuit which, together with the solid state amplifier, provides greater measurement accuracy and discrimination than traditional electrometer valve systems. The display meter has a taut band suspension and an 18 cm scale which is clearly graduated in both mV and pH units. The instrument is intended to be used only with E_07 electrodes. Outputs are provided for chart recorder operation.

A most important feature of the instrument is its very high long term stability. The power supply circuits being transistor stabilised, drift is virtually eliminated.

Operation

The controls are simple and clearly labelled.

When the instrument is switched to the 'standby' position both the full range and expanded range indicator lamps are lit at half power; when it is switched to 'full range' or 'expanded range', the appropriate lamp lights at full brightness and the other is extinguished.

In setting up the instrument for use, electrode temperature may be compensated manually by means of a built-in 10-turn helical potentiometer or it may be auto-compensated by means of the resistance thermometer accessory. pH buffer solutions are used to standardise the meter and the 'buffer control' is provided with a knob of large diameter for accurate fingertip-control.

Technical Data

Ranges	0 to 14 pH 14 expanded ranges of 1·4 pH 0 to ±1400 mV 14 expanded ranges from 0 to ±140 mV in steps of 100 mV to ±1300 to 1440 mV
Indicating meter	18 cm scale with sub-divisions of 0·01 pH and 1·0 mV
Zero stability	±0·003 pH indefinitely
Output	100μA per pH on normal range 1 mA per pH on expanded range
Input resistance	10^{13} ohm
Input current	Less than 10^{-13} amps
Temperature compensation	**Manual** 0 to 100°C with scale subdivided 0·1°C **Automatic** −5 to 100°C

EJ-655

Technical Data (continued)

Earthed solution	Equally suitable for earthed and unearthed solutions
Power supply	100/120 and 200/250V, 50/60 Hz
Dimensions	27 × 39 × 22 cm
Weight	8·6 kg

EJ-655

pH Meter, *Pye* **Model 290,** as specification complete, with type 401/E_07 combined electrode EJ-700 but without resistance thermometer or buffer tablets.
Each **£185**. **0**. **0**. *f*

REPLACEMENT PART

EJ-700	**Combined Electrode.** For details and price see entry in List No. sequence.

ACCESSORIES

EJ-657	**Resistance thermometer,** type 625, for temperature auto-compensation	Each £7. 10. 0. *f*
EJ-270	**Buffer tablets,** for pH meter standardisation	For details and prices see entries in List No. sequence
EJ-702	**Combined miniature electrode E_07** ...	
EJ-704	**Glass electrode E_07**	
EJ-710	**Reference electrode**	

LABORATORY PORTABLE pH METER

A completely self-contained fully portable instrument suitable for use with E_02 electrodes, mounted in a robust hardwood case. The accessorices are housed in one end compartment, and can be rapidly brought into use. The condition of the long life batteries can be checked using the built-in battery test facility.

Technical Data

Range	2 – 14 pH. May be extended to 0 – 14 pH by buffer control
Scale length	9 cm
divisions	0·2 pH
Accuracy	±1·0%
Batteries	*Ever Ready* LP/U2, 3 off *Ever Ready* B 115, 3 off
Dimensions	25·5 × 33 × 14·5 cm
Weight	4·9 kg

EJ-665

pH Meter, *Pye* **portable,** as specification, complete with spear pattern glass electrode EJ-667, calomel reference electrode EJ-668, electrode assembly kit, pH 4·01 buffer tablets, plastics beaker, 100 ml graduated bottle, saturated KCl solution and batteries.
Each **£70**. **0**. **0**. *f*

REPLACEMENT PARTS

EJ-667	**Glass electrode,** *Pye* type 11128 E_02.	Each £3. 0. 0. *f*
EJ-668	**Calomel electrode,** *Pye* type 11161.	Each £3. 0. 0. *f*
EJ-270	**Buffer tablets.** For prices see entry in List No. sequence.	

All items on this page normally available from stock.

LABORATORY pH METERS Models 78 AND 79

Robust and versatile, both instruments are simple to operate and to read. Their centre zero (pH7) taut band suspension meter combines stability with sensitivity and the mirror backed, 18 cm scale with knife edge pointer may be read with equal accuracy from sitting or standing positions.

Standard models are supplied with manual temperature compensation but the resistance thermometer accessory converts either model to temperature auto-compensation. A valve voltmeter of excellent long term stability practically eliminates drift. The meters are supplied with the *Pye* Ingold type 401/$E_0$7 combined glass and silver/silver chloride reference electrode and are only suitable for use with electrodes having an electrical null point (E_0 value) at pH7.

EJ-672 with EJ-700 and EJ-657

EJ-682 with EJ-700 and EJ-684

MODEL 78 Technical Data

Ranges	0–14 pH and 3·5–10·5 pH ±175 mV increased by steps of 200 mV to ±1175 mV
Meter	18 cm mirror scale Minimum scale division 0·05 pH, 2·5 mV Maximum discrimination 0·01 pH, 0·5 mV
Zero stability	0·02 pH/day 0·02 pH/10% change in supply voltage
Temperature compensation	0–100°C manual (or auto with resistance thermometer accessory)
Input Impedance	10^{12} ohms in parallel with 2000 pF
Power supply	110/120 and 200/250V 50/60 Hz
Dimensions	28 × 29 × 23 cm
Weight	9·5 kg

EJ-672

pH METER, *Pye* **Model 78,** as specification, complete with type 401/$E_0$7 combined electrode EJ-700, but without resistance thermometer or buffer tablets.

Each **£115. 0. 0.** *f*

REPLACEMENT PART

EJ-700 **Combined electrode.** For details and price see entry in List No. sequence.

ACCESSORIES

EJ-270	**Buffer tablets**	For details and prices see entries in List No. sequence.
EJ-657	**Resistance thermometer** ...	
EJ-702	**Combined miniature electrode,** $E_0$7	
EJ-704	**Glass electrode,** $E_0$7	
EJ-710	**Reference electrode**	

MODEL 79 Technical Data

Range	0–14 pH ±350 mV
Meter	18 cm mirror scale Minimum scale division 0·1 pH, 10 mV Maximum discrimination 0·02 pH, 2 mV
Zero stability	0·02 pH/day 0·03 pH/10% change in supply voltage
Temperature compensation	0–100°C manual (or auto with resistance thermometer accessory)
Input impedance	10^{12} ohms in parallel with 2000 pF
Power supply	110/120 and 200/250V 50/60 Hz
Dimensions	28 × 24 × 23 cm
Weight	8·2 kg

EJ-682

pH METER, *Pye* **Model 79,** as specification, complete with type 401/$E_0$7 combined electrode EJ-700, but without resistance thermometer or buffer tablets.

Each **£80. 0. 0.** *f*

REPLACEMENT PART

EJ-700 **Combined electrode.** For details and price see entry in List No. sequence.

ACCESSORIES

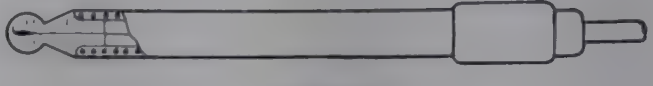
EJ-684	**Resistance thermometer, type 623,** for temperature auto-compensation	Each **£7. 10. 0.** *f*
EJ-270	**Buffer tablets**	For details and prices see entries in List No. sequence.
EJ-702	**Combined miniature electrode,** $E_0$7	
EJ-704	**Glass electrode,** $E_0$7	
EJ-710	**Reference electrode**	

All items on this page normally available from stock.

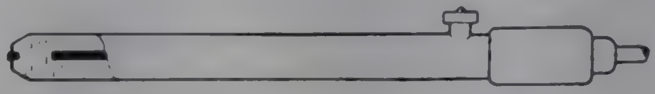
ELECTRODES FOR pH METERS

(Manufactured by W. G. Pye & Co. Ltd., under licence from Dr. W. Ingold, Zurich)

Pye Ingold electrodes for the Models 290, 78 and 79 pH meters have electrical null points (E_0 values) of pH 7. The E_0 value is the pH at which the glass and reference electrodes give zero output. $E_0$7 electrodes are superior to the conventional $E_0$2 electrodes in that they have increased shelf lives and improved high temperature performances.



EJ-700



EJ-710

List No.	Type No.	pH range	Temp. range °C	Stem dia. mm	Length mm	Description	Each	
EJ-700	401/$E_0$7	0—12	10 to 70	12	120	Combined glass bulb and silver/silver chloride reference electrode.	**£7. 0. 0.**	*f*
EJ-702	401/M5/$E_0$7	0—12	10 to 70	5	120	Combined glass bulb and silver/silver chloride reference electrode, miniature pattern.	**£8. 10. 0.**	*f*
EJ-704	201/$E_0$7	0—12	10 to 70	12	120	Spherical bulb glass electrode.	**£5. 0. 0.**	*f*
EJ-710	303	—	0 to 70	12	120	Calomel reference electrode with porous ceramic plug tip.	**£4. 10. 0.**	*f*

AUTOTITRATOR—CONTROLLER

This instrument is intended to link a suitable pH meter to solenoid controlled burettes or other means of titrant delivery so that titrations may be automatically controlled by pH or similar electrode potential measurements.

The autotitrator controller is suitable for use with pH meters having outputs of 100 μA/pH such as EJ-655 *Pye* Model 290 or EJ-672 *Pye* Model 78. It comprises two separate amplifiers which can be set to operate built-in relays at selected levels of input current and hence at selected pH values. The relays are changeover switches which can make or break power supply circuits to such external devices as:

- Titrant delivery values
- Solenoids
- Motorised flow controllers
- Alarm circuits

Use as an automatic titrator

When the autotitrator controller is connected to EJ-782 delivery unit and burettes such as BW-044, the assembly becomes suitable for any titration in which the end point can be detected by means of an electrode system and pH meter. In this application one relay may be used to control fast titrant delivery and the other to control slow delivery.

Use as a pH controller

The controller is used with delivery unit EJ-782 or solenoid valves and acid and alkali reagent reservoirs in conjunction with pH meter and electrodes to control the pH of any suitable system. One relay would be used to control the alkali supply solenoid valve and the other relay to control the acid supply valve.

Technical Data

Input resistance	400 ohms
Input current	0–1400 or 700–0–700 μA
Relay contact ratings	250V a.c., 5A, non-inductive
Dimensions	H W D 15 30 25 cm
Weight	7 kg

EJ-775

AUTOTITRATOR-CONTROLLER, *Pye*, as specification, with two amplifying channels to operate changeover relays, but **without pH meter or delivery unit.** For 110/120 and 200/250V 50/60 Hz supplies. Each **£95. 0. 0.** *fN*

Channel 1
Channel 2
autotitrator
controller

EJ-775

EJ-782

DELIVERY UNIT, comprises two electrically operated taps mounted side by side in a case made of resistant plastics and sealed to prevent leakage into the interior. The dead stop action of each tap is extremely fast and accurate. The flow rate is adjustable between 2 and 0·1 ml/sec by external glass stopcocks. Dimensions 25 × 15 × 10 cm. Weight 1·35 kg. For 110/120 or 200/250V 50/60 Hz supplies ... ... Each **£32. 0. 0.** *fN*

When ordering please specify voltage and nature of supply.

Items on this page normally available from stock except those coded *N*.

RECORDING POLAROGRAPH

A mains operated instrument for rapid, reliable and accurate determinations of many elements and compounds in solution. Measures concentrations down to 0·1 ppm. Overall accuracy ±2%, reproducibility better than 1%. Provides a permanent ink record of either direct or derivative polarograms—an important feature when distinguishing elements whose half-wave potentials are closer than 100 mV.

POLARISING POTENTIAL

The polarising potention is derived from a large auto-potentiometer driven through a friction clutch by a synchronous motor which is coupled to the recorder.

EJ-810

Range of polarising potential	−0·5V to +3·0V +0·5V to −3·0V
Steps	20 mV
Accuracy	±5 mV

Polarization rates:
1V per 100 sec equivalent to 2 in chart length
1V ,, 200 ,, ,, ,, 2 in ,, ,,
1V ,, 200 ,, ,, ,, 4 in ,, ,,
1V ,, 400 ,, ,, ,, 4 in ,, ,,

The polarograms may be run with increasing, decreasing or constant polarisation; the latter technique being particularly useful for the study of chemical reaction kinetics.

MEASUREMENT OF CELL CURRENT

After amplification the current from the dropping mercury electrode is fed into the built-in 0–5 mA suppressed zero strip chart recorder. Maximum obtainable sensitivity is 0·1 μA f.s.d. with a range of sensitivity from 0·1 to 150 μA f.s.d. in 34 steps. The calibrated width of the chart is 3½ in and it is subdivided into 100 parts. The d.c. amplifier is stabilised against voltage and frequency fluctuations and neither distortion of the waves nor displacement of the half wave potentials occurs.

CONTROLS

Damping can be varied over a wide range in five steps. Zero setting is by coarse and fine controls providing a total record shift of −6 to +4 chart widths. A counter current may be applied by a 10-step switch. The value of the counter current automatically increases at high sensitivities, though 96% of the true maximum current is measured before the mercury drop falls. The derivative circuit is applied by operating a selector switch.

ELECTRICAL SUPPLY

Available for 100/120 and 200-260V 50 Hz single phase supplies. Total power consumption 100W.

EJ-810

POLAROGRAPH, *Tinsley*, Mk 19/21, as specification, complete with dropping mercury electrode and stand, charts, pens and ink ... ... Each **£556. 8. 0.** *f*

When ordering please state voltage and nature of supply.

GENERAL PURPOSE POLAROGRAPH

A simple but accurate polarograph for use with a galvanometer or a potentiometric recorder. The instrument is self-contained in a case 32×25×14 cm.

EJ-820

POLARISING POTENTIAL

The motor driven slide wire potentiometer is graduated from +0·4 to −1·4V at 10 mV intervals. This range can be doubled to give +0·8 to −2·8V or −1V may be added to give −0·6 to −2·4V. There is provision for standardizing the slide wire current.

MEASUREMENT OF CELL CURRENT

The current from the dropping mercury electrode may be read on a high sensitivity spot galvanometer. The sensitivity of the polarograph is variable in ten steps covering total range 1/1 to 1/50; maximum sensitivity with a spot galvanometer being about 1 μA full scale deflection.

CONTROLS

Damping is continuously adjustable and controls are provided for pre-wave compensation (zero-setting). Terminals are fitted for connection to the dropping mercury electrode and to the current measuring device.

EJ-820

POLAROGRAPH, general purpose, *Cambridge*, as specification, without dropping mercury electrode or galvanometer... ... ... Each **£120. 0. 0.** *f*

ACCESSORIES

EJ-825	**Dropping mercury electrode,** with 2 ml cell, mounted on electrode stand	Each **£39. 10. 0.**	*f*
EJ-828	**Reflecting galvanometer,** *Cambridge* spot model, 450 ohm coil, lamp for 200/250V 50 Hz single phase supplies	Each **£25. 5. 0.**	*f*

RECORDING POLAROGRAPH

A direct-writing polarograph for rapid and accurate quantitative and qualitative determinations of most metals, many acid radicals and organic substances in solution. The instrument is completely self-contained in a case which measures 35×39×53 cm.

MEASUREMENT OF APPLIED POTENTIAL

The potentiometer is graduated from +0·4 to —1·4V at 5 mV intervals. This range can be doubled or halved. On the normal range —1·0V can be added making the range +0·6 to —2·4V. The wide range can be altered in steps of 0·4V covering +0·2 to —2·3V. On the chart a 0·1V interval is equivalent to 5, 10 and 20 mm respectively, on the three potential ranges.

For routine measurements the current through the potentiometer is adjusted by a rheostat, and indicated by a milliameter. For absolute measurement an external calomel reference electrode is available.

MEASUREMENT OF CELL CURRENT

The current from the polarograph cell is taken to a high stability linear amplifier which has a negligible input resistance. The resultant output is fed to a pointer galvanometer carrying the recording pen. Amplification is variable in steps, the maximum giving a sensitivity of 400 mm/μA, the minimum 0·4 mm/μA. Each sensitivity is a simple fraction of the maximum so that records taken at different sensitivities can easily be compared or measured in μA. The average step ratio is about 2/3 which allows any current to be recorded at not less than half the full chart width. For more accurate current readings, the test cell may be placed in a thermostat holder which fits onto the dropping mercury electrode stand.

DAMPING

To reduce the effect of current oscillations due to the variation in size of the mercury drops, the recorder movement is damped so that the shape of the average current curve is virtually unimpaired. The degree of damping has no appreciable effect on the input resistance of the amplifier. Damping is adjustable in six steps and is accurately reproducible.

COMPENSATING AND COUNTER CURRENT

Compensating current is provided to eliminate pre-waves and thus increase sensitivity over selected parts of the polarogram. Counter-current may be applied to eliminate the condenser current due to the growing drop. This increases in a negative direction with the increase of applied potential at a rate which may be adjusted.

CHART DRIVE

The paper chart has a recording space 75 mm on the current axis by 160 mm on the voltage axis and is clipped to a chart plate having a cylindrical curvature equivalent to the arc of motion of the pen. This ensures uniformity of current readings as the linear displacement on the chart is proportional to the angular movement of the galvanometer. During adjustment the chart can be lowered away from the pen. The potentiometer dial is visible in a window in front of the recording pen.

The chart position and the potentiometer can be adjusted independently. A clutch couples the potentiometer to the chart drive in any position so that recording can be started at any point. The chart can be driven at 15 or 3·75 mm/min. Records can be taken at constant potential if the potentiometer is uncoupled from the chart drive mechanism.

EJ-840

EJ-840

POLAROGRAPH, RECORDING, *Cambridge*, as specification. For 100/250V 50 Hz supplies. With dropping mercury electrode, stand, one 2 ml cell EJ-841 and 100 charts ... ... Each **£575.15. 6.** *f*

REPLACEMENT PARTS

EJ-841	**Cell,** 2 ml	Each **£2. 5. 0.**	*f*
EJ-842	**Capillary,** for dropping mercury electrode.	Each **£2, 5. 6.**	*f*

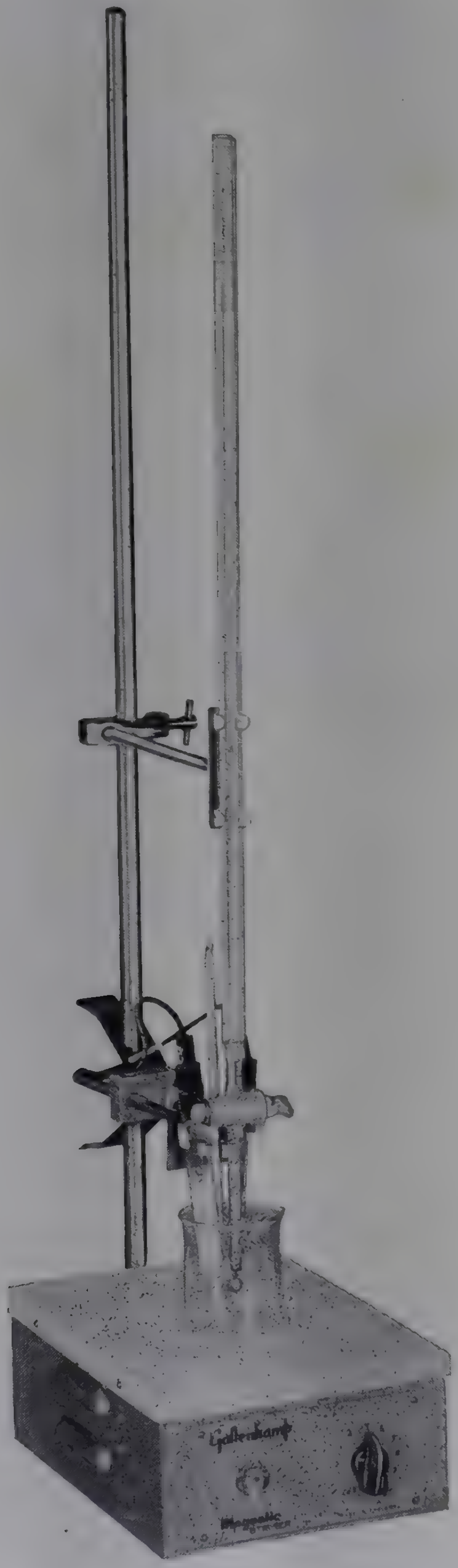
ACCESSORIES

EJ-843	**Thermostat,** with four 2 ml cells EJ-844.	Each **£65.17. 0.**	*f*
EJ-844	**Cell,** 2 ml, for use in thermostat ...	Each **£1.12. 0.**	*f*
EJ-845	**Cell,** 2 ml, for use with external electrode.	Each **£2. 5. 0.**	*f*
EJ-846	**Cell,** 2 ml, for use with external electrode in thermostat.	Each **£1.12. 0.**	*f*
EJ-847	**Cell,** 20 ml	Each **£2. 5. 0.**	*f*
EJ-850	**External electrode,** calomel reference.	Each **£3.19. 6.**	*f*
EJ-852	**External electrode,** calomel reference, for use with thermostat cells	Each **£3.19. 6.**	*f*
EJ-854	**Charts**	Per 100 **£0.14. 6.**	*f*

Gallenkamp TITRATION STAND ASSEMBLIES

For electrometric titrations at either ambient or elevated temperatures.

- **Efficient variable magnetic stirring**
- **Convenient and quick to use**
- **Accepts standard electrodes, burettes and thermometers**



EJ-920

One assembly is based on an unheated magnetic stirrer, the other on a magnetic stirrer with hotplate. The stirring speeds of both are variable and each assembly is fitted with a burette holder for burettes of capacities 5 cm^3 to 25 cm^3. The electrode holder with quick release bosshead enables the electrodes to be lifted clear of the titration vessel between tests.

EJ-920

TITRATION STAND ASSEMBLY, *Gallenkamp,* **unheated,** as specification, for **ambient temperature titrations.** Comprising:

SM-422	Support rod, stainless steel, size D.
SM-635	Bosshead.
SM-637	Bosshead, quick release.
SM-682	Burette holder, 10 mm clips.
SM-683	Electrode/thermometer holder.
SS-610	Magnetic stirrer.

For 220/240V 50 Hz single phase supplies.
Assembly **£18. 0. 0.** *b*

For 200/210V 50 Hz single phase supplies.
Assembly **£18. 0. 0.** *bN*

For 100/120V 60 Hz single phase supplies.
Assembly **£18. 10. 0.** *bN*

When ordering please state voltage and nature of supply.

EJ-925

TITRATION STAND ASSEMBLY, *Gallenkamp,* **heated,** as specification, for **ambient and higher temperature titrations.** Comprising:

SM-422	Support rod, stainless steel, size D.
SM-635	Bosshead.
SM-637	Bosshead, quick release.
SM-682	Burette holder, 10 mm clips.
SM-683	Electrode/thermometer holder.
SS-615	Magnetic stirrer/hotplate.

For 200/250V 50 Hz single phase supplies.
Assembly **£26. 10. 0.** *b*

For 100/120V 60 Hz single phase supplies.
Assembly **£27. 0. 0.** *bN*

When ordering please state voltage and nature of supply.

ACCESSORIES for EJ-920 and EJ-925

SM-682	**Burette holder with 6 mm clips for 1 and 2 cm^3 burettes and 13 mm clips for 50 cm^3 burettes ... ...**	For details and prices see entries in List No. sequence.
SS-630	**Magnetic followers, glass ... ...**	
SS-636	**Magnetic followers, polypropylene ...**	

OTHER ACCESSORIES see **Electrodes**
pH Meters
Burettes
Beakers

Items on this page normally available from stock except those coded *N*.

Gallenkamp
REGD TRADE MARK

POTENTIOMETRIC MICROTITRATION APPARATUS

For multiple, routine determinations of chloride in plasma, serum, cerebro-spinal fluids and urine, and for determinations of salinity.

FEATURES

- **Only 0·2 cm³ sample used**
- **Results direct in mE/litre**
- **1% accuracy**
- **Uses only two standard solutions—no indicators**
- **More rapid than other methods**

The apparatus was designed in collaboration with Professor I. D. P. Wootton, Ph.D., M.A., M.B., B.Chir., F.R.I.C. and is described in 'Micro-Analysis in Medical Biochemistry,' 3rd ed. by E. J. King and I. D. P. Wootton. See also Laboratory Equipment Test Report No. 35 'Laboratory Practice,' 8, 1959, 11.

POTENTIOMETER

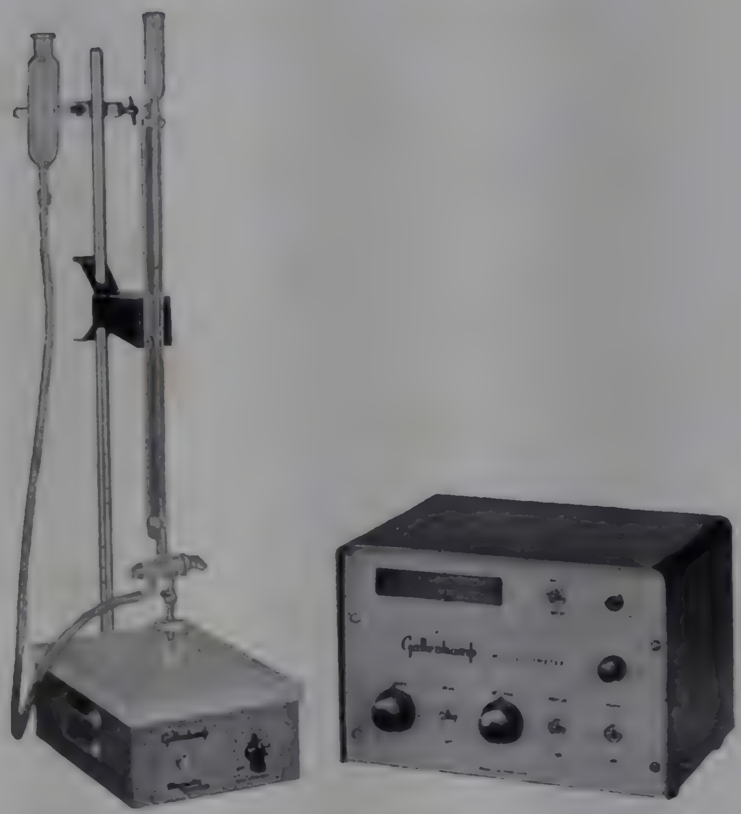
An orthodox double triode valve millivoltmeter with stabilised power supply. The built-in indicator is a taut suspension, short period galvanometer of very rugged construction, which is entirely free from sticking. Controls provide for adjustment of mechanical zero of the galvanometer, setting the electrical zero of the electronic circuit, adjusting the gain for scale width, and switching on the stirrer in stand.

STAND

A variable speed magnetic stirrer which can be stopped and started from the potentiometer is fitted with a quick release burette holder and clamp for a reagent reservoir. The burette holder has a back plate with engraved vertical line for accurate burette reading.

BURETTE

A 5 cm³ burette, sub-divided in 0·02 cm³, with extra fine jet to minimise back-diffusion. To allow titrations to be carried out in a 10 ml beaker the burette has a sealed in platinum electrode and a silver electrode alongside the jet. A double-bore stopcock with side arm allows filling from the reservoir.



EJ-930

EJ-930

POTENTIOMETRIC MICROTITRATION APPARATUS, *Gallenkamp*, as specification, comprising:

EJ-932	Potentiometer.
EJ-935	Burette holder.
EJ-936	Burette.
EJ-938	Silver wire.
EJ-946	10 Followers, magnetic, 10 mm, polythene covered.
MF-910	Reservoir, 40 ml.
MK-055	12 Beakers, 10 ml.
SS-610	Magnetic stirrer.

For 220/240V 50 Hz single phase supplies. Each **£139. 0. 0.** *b*

For 200/210V 50 Hz single phase supplies. Each **£140. 0. 0.** *bN*

For 100/120V 60 Hz single phase supplies. Each **£140. 0. 0.** *bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

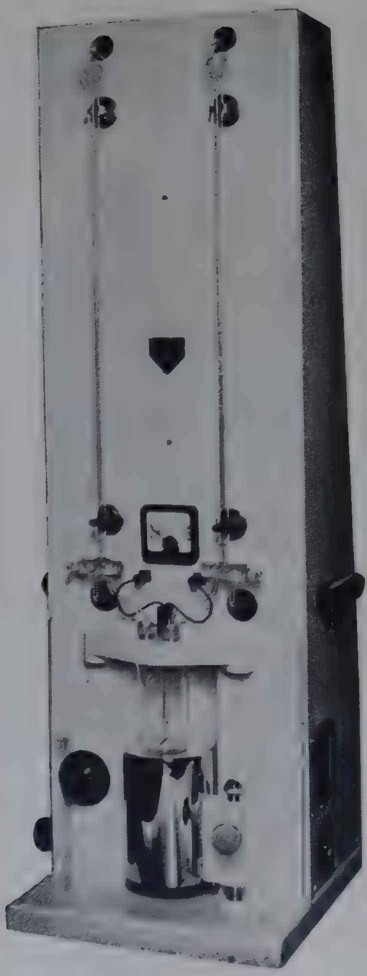
EJ-932	**Potentiometer**, as specification ...	Each £113 10. 0.	g
EJ-935	**Burette holder and backplate assembly complete with mounting rod**	Each £8. 10. 0.	b
EJ-936	**Burette**, as specification	Each £3. 16. 0.	a
EJ-938	**Silver wire**, 25 cm, for electrodes.	Each £0. 5. 0.	g
MF-910	**Reservoir**, 40 ml	For full details and prices see entries in List No. sequence.	
SS-610	**Magnetic stirrer**		
MK-055	**Beaker**, glass, 10 ml		
EJ-940	**Valve**, *Brimar* EZ80	Each £0. 8. 2.	m
EJ-941	**Valve**, *Brimar* 6158	Each £1. 5. 0.	m
EJ-942	**Valve**, *Brimar* OA2	Each £0. 17. 6.	m
EJ-944	**Galvanometer lamp**, 4V, 0·5A, M.E.S.	Each £0. 11. 0.	m
EJ-946	**Follower**, magnetic, 10 mm, polythene covered.	Pack of 10 £0. 6. 6.	D

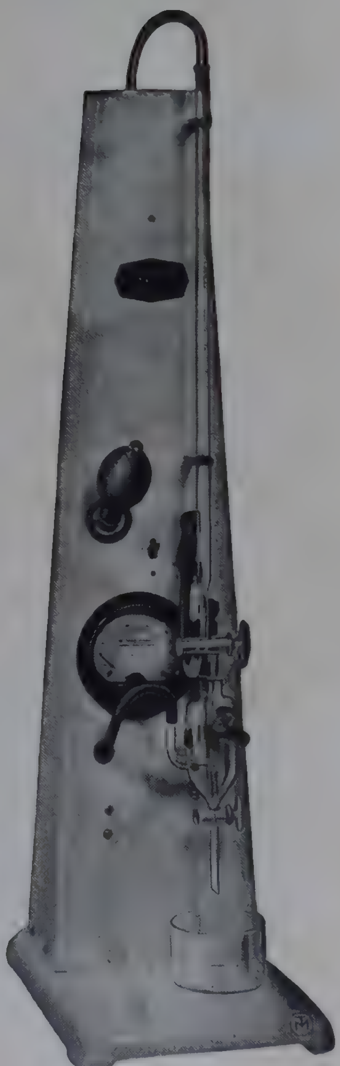
Items on this page normally available from stock except those coded *N.*

KARL FISCHER ELECTROMETRIC APPARATUS

FOR MOISTURE DETERMINATIONS

The Karl Fischer method for the estimation of water utilizes the reaction of the water with iodine and sulphur dioxide in the presence of pyridine. In principle the electrical system of the electrometric apparatus comprises a pair of platinum electrodes, polarised by an applied e.m.g. In the presence of excess water and spent reagent, the anode is depolarised while the cathode remains polarised. As the gas film surrounding the cathode prevents current passing, the low resistance galvanometer, which effectively shunts the electrodes, registers a deflection. Addition of reagent in slight excess causes the cathode to depolarise and so register the end point as zero on the galvanometer. To achieve more accurate results, back titration may be employed.


EJ-960


EJ-980

MAINS OPERATED KARL FISCHER ELECTROMETRIC APPARATUS

A self-contained instrument incorporating a highly sensitive end-point indicating circuit. This apparatus conforms to BS 2511, the glass parts comprising two 25 cm³ burettes, two reagent reservoirs, two reservoir filling funnels, five desiccant guard tubes and a vacuum control stopcock. Other parts are a standard glass titration vessel with adjustable magnetic stirring, an indicating micro-ammeter with its scale marked 'Excess Water' and 'Excess Fischer' and sockets and terminals for the platinum electrodes. Nitrogen drying nozzles are fitted.

EJ-960

KARL FISCHER ELECTROMETRIC APPARATUS, *BTL*, to BS 2511, for the determination of moisture, as specification. For 110/120, 200/220 or 230/250V a.c. supplies. **Without chemicals** ... Each **£139. 0. 0.** *f*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

EJ-962	**Titration vessel,** standard ...	Each	**£1. 1. 0.**	*f*
EJ-964	**Twin platinum electrode** ...	Each	**£3. 0. 0.**	*f*
EJ-966	**Burette,** 25 cm³, right side ...	Each	**£3. 10. 0.**	*f*
EJ-967	**Burette,** 25 cm³, left side	Each	**£3. 10. 0.**	*f*

ACCESSORIES

EJ-972	**Titration vessel,** with side tube for filling and rubber cap	Each	**£1. 12. 0.**	*f*
EJ-973	**Titration vessel,** as EJ-972 but with draining tube and stopcock	Each	**£2. 15. 0.**	*f*

BATTERY OPERATED KARL FISCHER ELECTROMETRIC APPARATUS

A self-contained instrument using a jet of dry nitrogen to agitate the contents of the titration vessel. This apparatus is based on a method described by Bonner, the glass parts comprising a 25 cm³ burette with a double-bore stopcock, three drying bottles and a titration vessel. The latter has four tubulures for the introduction of the nitrogen stream, the tip of the burette containing reagent, the twin platinum electrode glass sheath and the sample by a pipette or hypodermic syringe. Other parts are a blowing bulb, clips to take a standard 500 ml bottle of *BDH* Fischer reagent, a battery operated potentiometer and an indicating microammeter.

EJ-980

KARL FISCHER ELECTROMETRIC APPARATUS, *T & M*, for the determination of moisture, as specification. **Without chemicals.** ... ... Each **£32. 10. 0.** *f*

REPLACEMENT PARTS

EJ-982	**Titration vessel,** without electrodes.	Each	**£3. 6. 0.**	*f*
EJ-984	**Twin platinum electrode,** in glass sheath.	Each	**£0. 14. 6.**	*f*
EJ-985	**Burette,** 25 cm³	Each	**£1. 5. 9.**	*f*

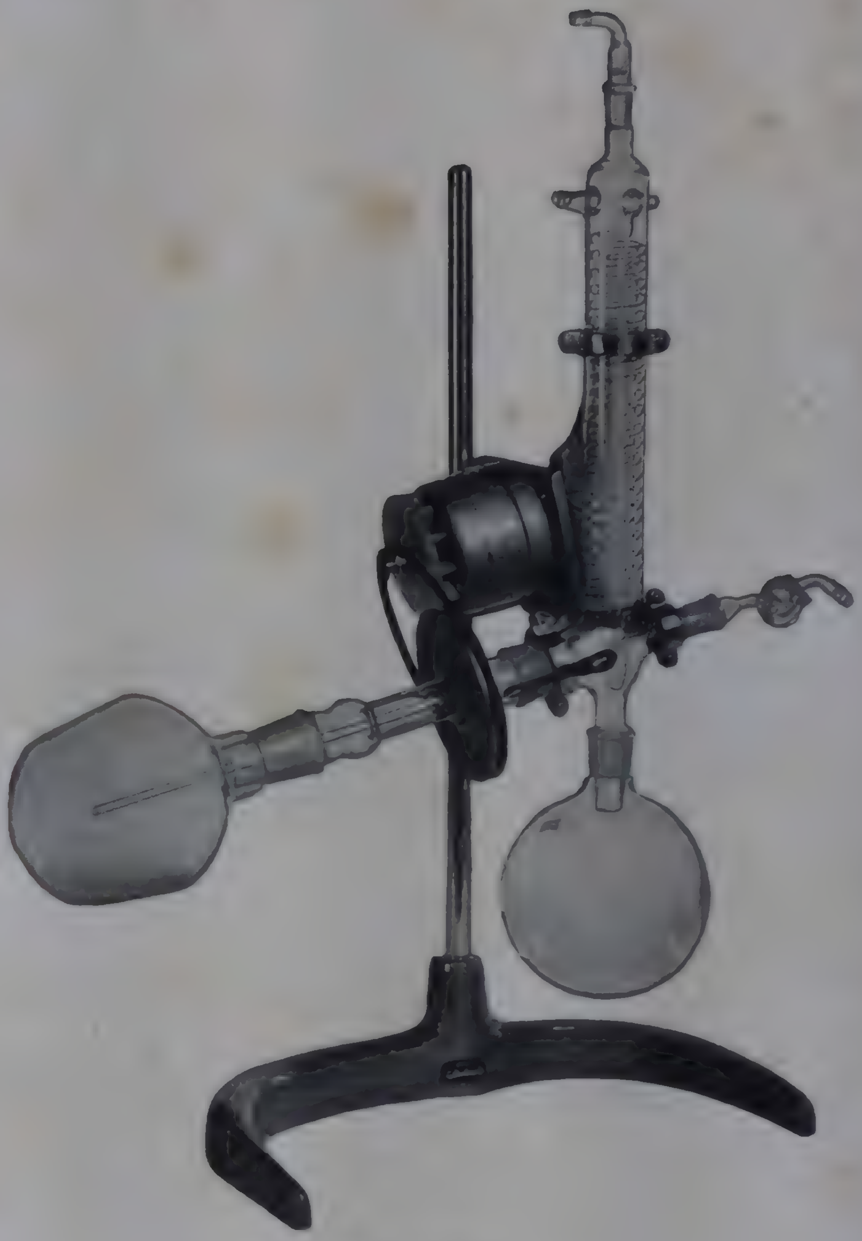
FIXED CONDENSER ROTARY FILM VACUUM EVAPORATOR

The rotary film evaporator is a convenient and efficient apparatus for the rapid separation of solvents by distillation at reduced pressure and controlled temperature. It operates on the principle of continuously spreading a thin film of the solution over a large area, so providing a large evaporating surface.

It is particularly suitable for evaporating to dryness either solutions containing heat-sensitive solutes or very dilute solutions such as those obtained from chromatographic and countercurrents separations. It may also be used advantageously to distil off solvents which normally bump or froth.

DESCRIPTION

The apparatus comprises basically an evaporator flask, a condenser, receiver, feed tube and driving motor mounted on a stand. The condenser is supported by an adjustable cast aluminium bracket which also carries a shaded pole motor. A precision ground glass bearing fits into the condenser with a standard joint and carries a pulley on a sealed ball bearing. The evaporator flask, specially shaped for producing the maximum film area, is fitted by a standard joint to a precision bore sleeve gland which fits accurately over the glass bearing. The pulley is driven by a vee belt from the motor and, when vacuum is applied to the glass assembly, the flanged end of the sleeve gland is drawn into contact with a friction washer on the pulley and thus rotated. The whole assembly may be readily adjusted for height by means of a single adjusting knob. All glass components are of borosilicate glass and are interchangeable.



EU-050

EU-050

EVAPORATOR, ROTARY FILM VACUUM, as specification, including stand, driving motor, condenser, inlet tube, vacuum adapter, 1 litre evaporator flask, 1 litre receiver flask and a supply of silicone lubricant. For 230/250V a.c. single phase supplies. Each **£40. 0. 0.** *m*

Also available to order for 100/110 or 200/220V a.c. supplies.

REPLACEMENT PARTS AND ACCESSORIES

EU-055 **Evaporator flasks,** taper sided.

Capacity, nominal	25	50	150	250	500	1000 ml	
Capacity, working	10	20	60	100	200	400 ml	
Socket	19/26	19/26	24/29	24/29	24/29	34/35	
Each	**14/9**	**16/–**	**19/6**	**19/6**	**22/–**	**31/–**	*m*

EU-057	**Condenser,** with 34/35 and 19/26 sockets, and 24/29 cone	Each **£7. 15. 0.**	*m*
EU-058	**Inlet tube,** with stopcock, for continuous feed. 19/26 cone	Each **£2. 1. 0.**	*m*

EU-060 **Sleeve glands,** with cone to fit evaporator flask and precision bore sleeve.

Cone	19/26	24/29	34/35	
Each	**28/–**	**28/–**	**31/–**	*m*

EU-062	**Glass bearing,** precision ground, with 34/35 cone (without pulley)	Each **£1. 11. 0.**	*m*
EU-064	**Friction washer**	Dozen **£0. 7. 6.**	*m*
EU-066	**Lubricant,** silicone, plastics dispensing bottle containing approx. 25 ml	Each **£0. 4. 0.**	*m*
EU-068	**Driving belt**	Each **£0. 7. 0.**	*m*
Q-FRIL/3S	**Receiver flask, 1 litre**	For prices see entries in List No. sequence.	
Q-MF10/2B	**Vacuum adapter, 19/26**		

Water bath suitable for heating evaporator flask see WF-190 in List No. sequence.

Also available to special order:

Flasks with cone joint neck to avoid contamination by lubricant, together with suitable adapters.

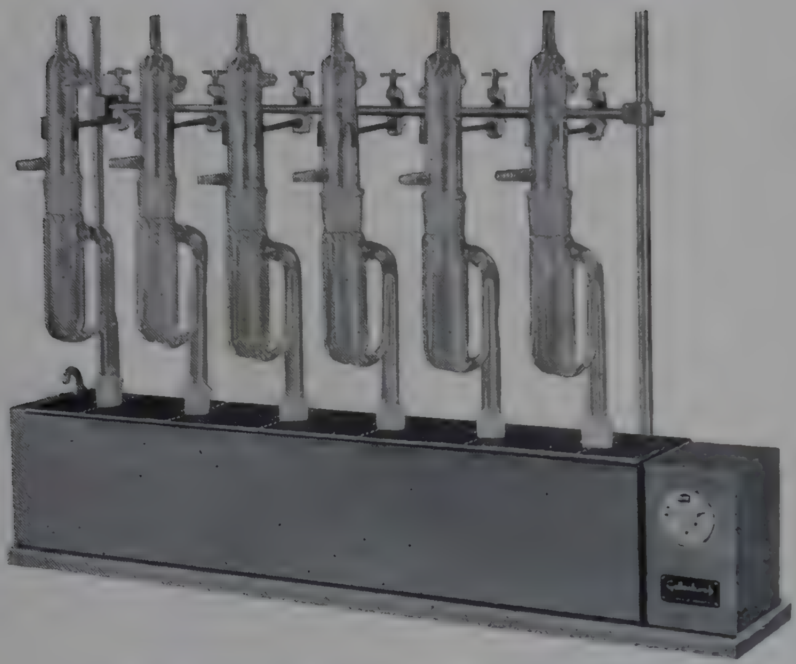
Multi-neck sleeve glands for 4 × 250 ml flasks. Variable speed motor.

Clamp bolt for mounting on laboratory support frames.

EMBEDDING OVENS	see	HISTOLOGY
EMULSIFIERS	see	MIXERS
ENTOMOLOGY	see	BIOLOGICAL SCIENCES
EUDIOMETER	see	GAS EUDIOMETER
EVAPORATORS		
Rotary film	see	QUICKFIT APPARATUS
EXPLOSION PIPETTES	see	GAS ANALYSIS

All items on this page normally available from stock.

Gallenkamp WATER BATHS FOR SOXHLET EXTRACTIONS



EV-100 with six extraction apparatus EV-285

EV-100

WATER BATH, Soxhlet, *Gallenkamp*, **stainless steel,** to take six flasks up to 500 ml capacity. This bath, overall dimensions 18×85×16·5 cm high (7×33½×6½ in), has a sectional top cover for easy access to the flasks. The welded steel base supports two duralumin rods, extending 60 cm (24 in) above the bath top, carrying an adjustable horizontal rod fitted with six spring condenser clamps. The flasks are supported by a shelf covering the 1 kW tubular immersion element which extends practically the whole length of the bath for uniform heating. The control compartment also houses an energy regulator for temperature control. With built-in constant level device and 90 cm of 3-core cable but **without glassware.**

For 220/240V a.c. single phase supplies.	Each **£58.10. 0.**	*bS*
For 200/210V a.c. single phase supplies.	Each **£58.10. 0.**	*b*
For 110/120V a.c. single phase supplies.	Each **£59. 0. 0.**	*b*

REPLACEMENT PART

EV-102	**Immersion element, 1 kW, single loop.**	Each **£3.18. 0.**	*bS*

When ordering please state voltage and nature of supply.

AIR BATHS FOR SOXHLET EXTRACTIONS

EV-152 and EV-154

Designed for flasks of 100/150 and 200/350 ml capacity. Heated by coiled-coil nickel-chromium elements supported by knitted glass fabric very close to the flasks. Heat losses are minimised by glass wool insulation. Temperature is accurately controlled by built-in energy regulators, one for each flask position.

Overall width 25 cm; length of 3-position baths 66 cm, length of 6-position baths 117 cm.

For 100/130 or 200/250V single phase a.c. supplies.

AIR BATHS, *Electrothermal.*

List No.	Ref. No.	Flasks No. × ml	Watts at 250V	Each	
EV-144	ME436	3×100/150	300	**£40. 0. 0.**	*m*
EV-146	ME437	3×200/350	450	**£42. 0. 0.**	*m*
EV-152	ME466	6×100/150	600	**£66. 0. 0.**	*m*
EV-154	ME467	6×200/350	900	**£70. 0. 0.**	*m*

When ordering please state voltage and nature of supply.

Items on this page coded *S* normally available from stock.

SOXHLET EXTRACTORS

EV-280

EXTRACTORS, Soxhlet type AG improved pattern. Regd. Design No. 911418. A compact extractor in which the siphon tube is protected by being enclosed within the vapour tube. Reduces breakage and permits very high boiling rates due to large diameter of vapour tube. The siphon operates reliably with water or organic solvents at all normal rates of extraction.

Cone	24/29	24/29	29/32	
Socket	29/32	40/38	50/42	
Extractor capacity	60	100	200 ml	
To take thimble size	22×80	30×100	41×123 mm	
Dozen	**360/-**	**420/-**	**530/-**	*a*
Each	**33/-**	**38/-**	**48/-**	

EV-285

EXTRACTION APPARATUS, Soxhlet, AG. Each assembly comprises extractor EV-280 with flask FJ-110 and Davies double surface condenser. On the two larger sizes the cone joint of the condenser forms the lower end of the water jacket, making a compact and convenient extraction combination.

Extractor	60	100	200 ml	
Flask capacity	150	250	500 ml	
Flask socket	24/29	24/29	29/32	
Condenser cone	29/32	40/38	50/42	
Condenser List No.	CU-520	CU-530	CU-530	
Condenser jacket length	15	20	20 cm	
Dozen sets	**840/-**	**980/-**	—	*a*
Set	**76/-**	**88/-**	**108/-**	

AG FRITTED GLASS EXTRACTION THIMBLES

EV-400

EXTRACTION THIMBLES, AG, fritted borosilicate glass. These thimbles consist entirely of fritted glass with a wall thickness of 2-3 mm. They are mechanically strong and thus convenient to handle when wet. For the majority of purposes this advantage can be obtained at no greater cost than for paper thimbles as the higher initial cost is offset by repeated use. Available in two porosities, coarse (approximately equivalent to porosity 1) and fine (approximately equivalent to porosity 3).
For full details of pore sizes and other useful information see data pages 296/7 on **FRITTED FILTRATION APPARATUS.**

Nominal size	22×80	30×100	41×123 mm	
Suitable for extractor EV-280, 285, size	60	100	200 ml	
Quickfit	Q-EX5/43	Q-EX5/63	Q-EX5/83	
Dozen boxes	**700/-**	**800/-**	**920/-**	*a*
Box of 3	**64/-**	**72/-**	**84/-**	

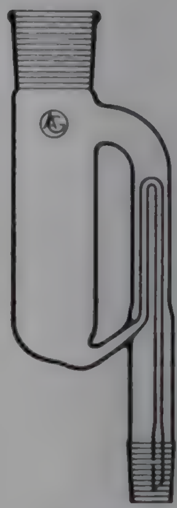
When ordering please state coarse or fine porosity.

EV-420

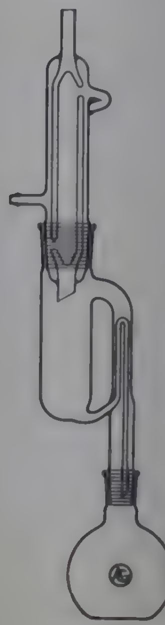
EXTRACTION THIMBLES, AG, borosilicate glass, with fritted glass plate fused into glass tube, for use in place of paper thimbles in Soxhlet extractors. Can be ignited, or dried to constant weight.

Ref. Nos.	56X1 56X2	57X1 57X2 57X3	58X1 58X2		
Plate dia.	20	30	40	mm	
Height above plate	75	95	110	mm	
Nominal size	22×80	30×100	41×123	mm	
For use in extractor EV-280, 285, size	60	100	200	ml	
Dozen	**84/-**	**96/-**	**120/-**		*a*
Each	**8/-**	**9/-**	**11/-**		

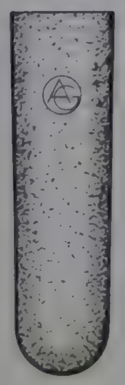
When ordering please state Ref. No.



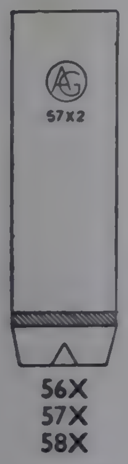
EV-280



EV-285



EV-400



EV-420

EV-450

EXTRACTION THIMBLES, *Whatman,* fat-free, seamless. Single thickness. In boxes of 25.

EV-452

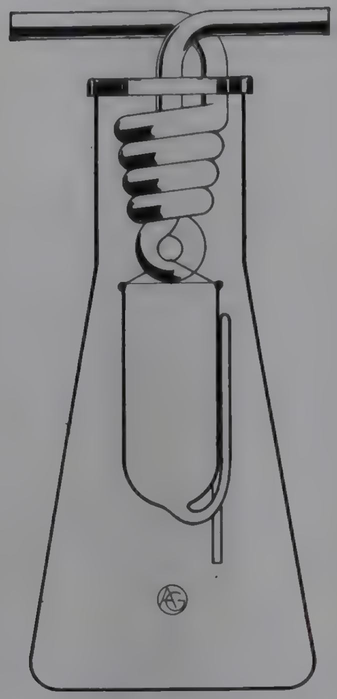
EXTRACTION THIMBLES, *Whatman,* as EV-450 but double thickness.

List No.	EV-450	EV-452		EV-450	EV-452	
Size mm	Box of 25		Size mm	Box of 25		
10×50	**12/6**	—	28×118	**21/3**	—	*d*
19×90	**15/-**	—	30×100	**20/-**	**33/-**	*d*
22×80	**15/-**	**25/-**	33×80	**20/-**	**33/-**	*d*
25×80	**15/-**	—	33×94	**21/3**	—	*d*
25×100	**16/6**	**27/6**	33×118	**27/-**	—	*d*
26×60	**16/6**	**27/6**	41×123	**32/6**	—	*d*

Other sizes in single or double thickness to order.

Quickfit **extraction apparatus, see QUICKFIT APPARATUS**

All items on this page normally available from stock.



EV-570 with EV-575 and EV-580

EV-570

EXTRACTION FLASK, conical, *Pyrex brand* glass. Suitable for rubber analysis to ASTM D297 when used with accessories listed below. Capacity 400 ml.
Std. pack of 6 **£1. 3. 0.** Each **£0. 5. 2.** *d*

ACCESSORIES

EV-575 **Condenser,** block tin spiral pattern, to fit neck of flasks EV-570 ... ... Each **£4. 4. 0.** *m*

EV-580 **Siphon cup,** borosilicate glass, with two suspension holes. Approximately 28 mm int. dia. and 65 mm long. Each **£0. 5. 9.** *a*

Suitable **extraction thimbles** see EV-450 and EV-452.

EXTRACTION APPARATUS, for the determination of the acetone extract value of solid unvulcanised natural rubber, to BS 903 and BS 1673 Part 2. The joint sizes of components shown in the specifications are not mandatory so several alternative assemblies are possible from *Quickfit* components. The following assemblies are the simplest and most economical to meet the requirements.

Extractor cup capacity	20	50 ml
Condenser	Q-CX 3/05	Q-CX3/07
Extractor body	Q-EX 7/13	Q-EX 7/23
Extractor cup	Q-EX 7/10	Q-EX 7/20
Flask	Q-FF 150/3S	Q-FF 250/3S

For prices and details of above components see entries under QUICKFIT APPARATUS.

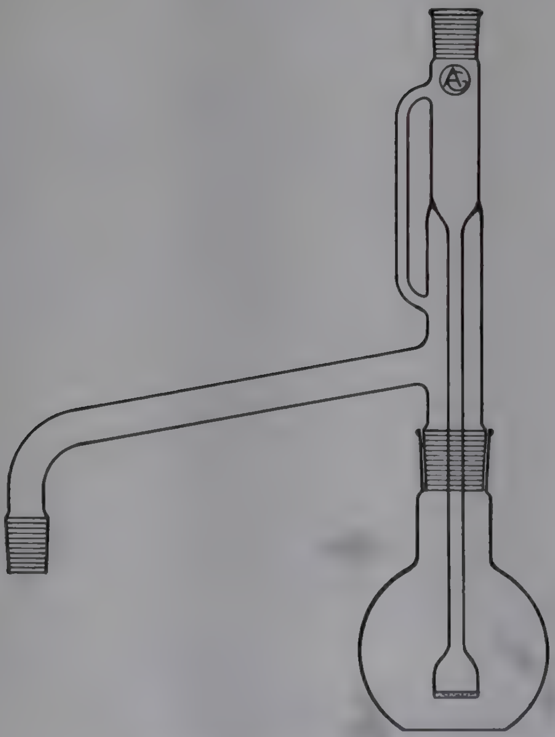
HOLLIMAN CONTINUOUS EXTRACTION APPARATUS

This apparatus, for the continuous extraction of liquids by means of less dense, immiscible solvents, was designed in co-operation with Professor F. G. Holliman† of the University of Leeds.

The extractor is assembled with suitable boiling and extraction flasks and a double surface condenser. A magnetic stirrer is also required. The boiling flask is charged with ether or a similar solvent and the liquid sample is placed in the extraction flask. The ether is boiled, the vapour condenses in the double surface condenser and ether collects in the vertical tube with a fritted glass distributor through which it bubbles when a sufficient head develops. The ether droplets, after brisk agitation by magnetic stirring, rise to the surface of the sample and finally return down the side-arm to the boiling flask, for the process to be repeated.

The apparatus is made in two sizes, the smaller extracts from a 500 ml flask and the larger is for use with flasks of 1 or 2 litres and, in this respect, is more versatile than other designs.

† F. G. Holliman. J.Chem.Ed. **29**, 1952, 96.



EV-730 with EV-732

EV-730

EXTRACTORS, LIQUID, Ⓐ, **Holliman,** borosilicate glass with 19/26 socket to condenser, 24/29 cone to boiling flask and 34/35 cone to extraction flask. With fritted disk porosity 0. **Without flasks or condenser.**

Size No.	1	2	
Overall height	38	62 cm	
Extraction flask size	0·5	1, 2 litre	
Each	**84/–**	**108/–**	*a*

ACCESSORIES

EV-732 **Extraction flasks,** Ⓐ, borosilicate glass, with 34/35 socket.

Capacity	0·5	1	2 litre	
Extractor No.	1	2	2	
Dozen	**140/–**	**195/–**	**265/–**	*a*
Each	**12/9**	**17/6**	**24/–**	

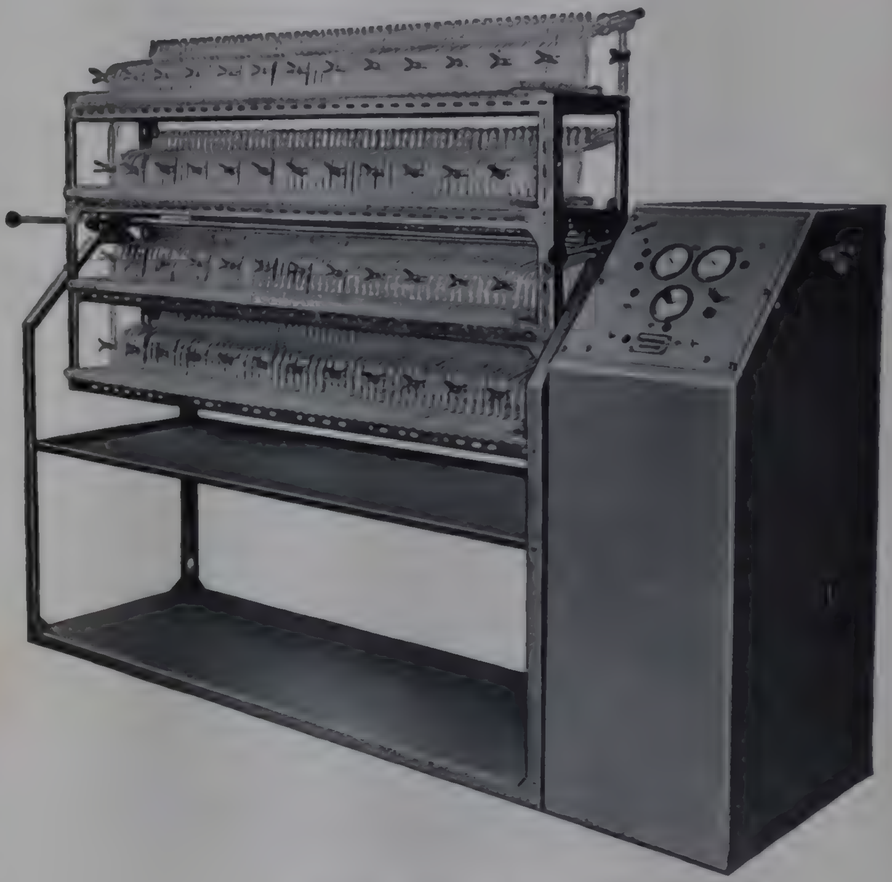
Double surface **condensers** see CU-520.
Boiling flasks see *Quickfit* flasks.
Magnetic stirrer see SS-610.

All items on this page normally available from stock.

COUNTERCURRENT APPARATUS

For the separation of complex mixtures of antibiotics, alkaloids, peptides, steroids, sugars, biological factors and vitamins.

- **Interchangeable, accurately matched, all-glass partition tubes**
- **Range of lower phase capacities**
- **Lower phase volumes accurate to ±2%**
- **Totally enclosed extraction system**
- **Can be used anaerobically**
- **Adjustable shaking time controller**
- **Adjustable settling time controller**
- **Automatic transfer counter**
- **Smooth and quiet operation**
- **Partition tubes easily removed for cleaning**
- **Free standing frames on castors for mobility**



EV-810 with EV-820

PRINCIPLE

The fundamental principles governing the partition of solutes between two immiscible solvents have long been understood but it is only recently that the technique has been applied to the separation of complex materials.

The difficulty of multiple extraction was, previous to the work of Craig, primarily one of handling. In order to obtain a satisfactory separation of a component with a low partition coefficient, a large number of extractions were required, and to perform these by hand was laborious and time consuming. Craig developed a multistage liquid/liquid extractor in which the materials to be separated are made to divide between two immiscible solvents. This extractor enables a large number of consecutive extractions to be carried out with the minimum of effort on the part of the operator.

The technique now forms a valuable adjunct to chromatographic processes such as absorption, vapour phase, ion exchange and paper chromatography.

MODELS

The apparatus is available in three main models, the first two of which may have various numbers and sizes of partition tubes:

Standard automatic model,
Micro automatic model,
Small scale manual model,

Stand units may be used manually on occasions when automatic operation is not required. Switching accessories are available for operation of fraction collector.

Modified units of compact design with lower phase capacities of 10 ml or less can be supplied on stand units of 400 to 800 tubes.

Other types of non-standard apparatus can be quoted on receipt of detailed requirements.

GLASSWARE

The partition tubes are of an improved design made up in units of 5 tubes (100 ml size 4 tubes) terminating in interchangeable ball and socket joints. These units are assembled in banks forming a totally enclosed extraction system, thus permitting the use of volatile solvents and/or operation under anaerobic conditions.

The lower phase section of each partition tube is individually calibrated to an accuracy of ±2%. The design is such that no liquid can be trapped in the transfer tubes. Each tube is fitted with a stopper which may be of glass or plastics. Any stopper may be replaced by a stopcock adapter for the removal of samples.

A recycling adapter set is available for returning the discharge from the last tube back to the first tube for further extraction.

Partition tubes, of lower phase capacities other than those listed, can be made to special order.

COUNTERCURRENT APPARATUS

(continued)

- **Automatic shut-off switch on transfer counter**
- **Recycling switch with signal light**
- **Cut-out switch for manual shaking and transfer operations**
- **Totally enclosed drive mechanism**
- **Separate robot drive unit can be coupled to any 1 or 2 extraction stands**

Control panel of EV-810

STANDARD AUTOMATIC MODEL (British Patent No. 802954).

The robot control of this model is a self-contained free standing assembly with two driving shafts which can be coupled to one or two extraction stands. The latter may be selected from ten patterns having different numbers of tubes of various capacities.

The drive robot contains the driving motors for shaking and tipping mechanisms together with all the necessary automatic controls, timers, transfer counter, switches and signal lights. When started, the following series of operations is carried out and repeated until the machine is automatically switched off after a predetermined number of transfers:

(*a*) A period of shaking which is variable up to 5 minutes on the shaking time controller.

(*b*) Shaking racks stopped at correct angle for settling.

(*c*) A stationary time variable between 0 and 50 minutes for settling to take place.

(*d*) Racks tipped to decant position and held for about 30 sec.

(*e*) Racks tipped and held 10 sec to allow drainage of excess upper phase from automatic dispenser.

(*f*) Racks tipped to transfer position when upper phase moves forward one tube. This position is held for 30 sec for drainage of transfer, after which the whole cycle recommences with a further shaking period.

The upper phase from the final tube may be either discharged into an automatic fraction collector or, by using the recycling adapter set, returned to the first tube.

EV-810

DRIVE ROBOT, for countercurrent apparatus, floor standing pattern on castors, as above specification, with two drive shafts for coupling to one or two extraction stands EV-812 to EV-821. For 200/220 or 230/250V 50 Hz single phase supply. **Requires but does not include extraction stand.**

Each **£494. 10. 0.** *m*

When ordering please state voltage and nature of supply.

EXTRACTION STANDS, standard, Craig type, for use with drive robot EV-810, complete with tubes, glass stoppers and stopper ties, automatic upper phase dispenser and upper phase reservoir. Upper phase dispensers are supplied with a capacity equal to that of the lower phase (except for 100 ml tubes where an 80 ml dispenser is used).

List No.	No. of tubes	No. of banks	Lower phase capacity ml	Maximum upper phase capacity ml	Nominal length cm	Each	
EV-812	50	2	10	40	90	**£255. 0. 0.**	*m*
EV-813	50	2	20	40	90	**£255. 0. 0.**	*m*
EV-814	50	2	40	40	90	**£255. 0. 0.**	*m*
EV-815	40	2	100	80	90	**£286. 0. 0.**	*m*
EV-816	120	2	10	40	200	**£494. 10. 0.**	*m*
EV-817	120	2	20	40	200	**£494. 10. 0.**	*m*
EV-818	120	2	40	40	200	**£494. 10. 0.**	*m*
EV-819	96	2	100	80	200	**£587. 5. 0.**	*m*
EV-820	240	4	10	20	200	**£927. 0. 0.**	*m*
EV-821	240	4	20	20	200	**£927. 0. 0.**	*m*

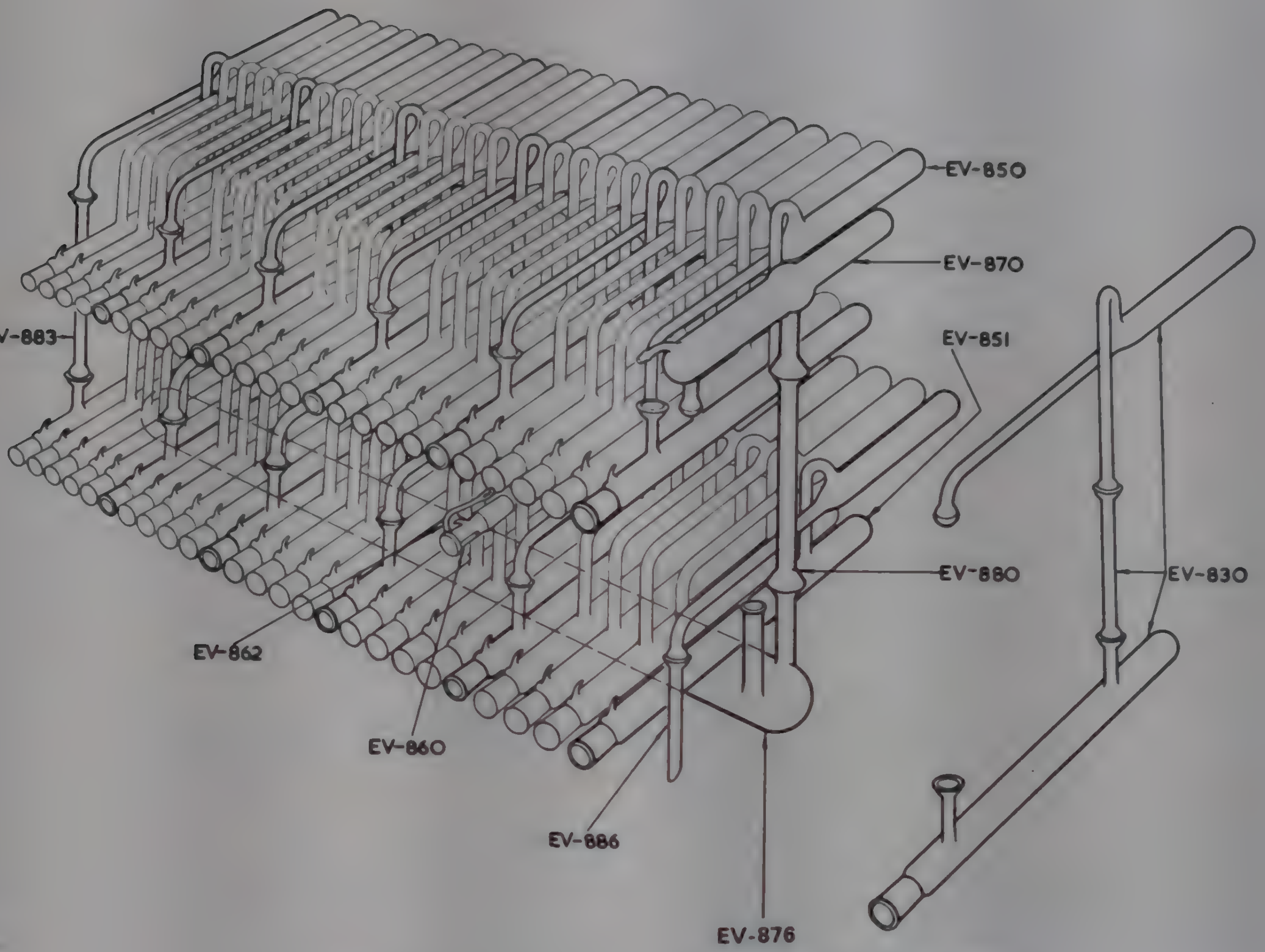
ACCESSORIES

Recycling adapter sets, comprising equilibration tube with stopper, stopper tie, transfer tube, connector tube and joint clips.

List No.	For use with extraction units	Capacity ml	Each	
EV-830	EV-812 EV-816	10	**£7. 0. 0.**	*m*
EV-831	EV-813 EV-817	20	**£7. 0. 0.**	*m*
EV-832	EV-814 EV-818	40	**£7. 0. 0.**	*m*
EV-833	EV-815 EV-819	100	**£8. 0. 0.**	*m*
EV-834	EV-820	10	**£7. 10. 0.**	*m*
EV-835	EV-821	20	**£7. 10. 0.**	*m*

COUNTERCURRENT APPARATUS

ACCESSORIES AND REPLACEMENTS



Diagrammatic view of 2-bank countercurrent apparatus

EV-840

STOPCOCK ADAPTER, for the removal of samples from partition tubes. Consists of 19/26 cone fitted with disk type grease free stopcock ... ... Each £1. 14. 0. *m*

Partition tube sets. Each set comprises 4 or 5 tubes of borosilicate glass all sealed together and fitted at the connecting ends with ball and socket joints. The lower phase capacity of each tube is adjusted within ±2%. Sets are all interchangeable with others of the same capacity. Without stoppers.

List No.	Hand	No. of tubes	Lower phase capacity ml	Maximum upper phase capacity ml	Each	
EV-850 **EV-851**	left right	5	10	40	£13. 5. 0.	*m*
EV-852 **EV-853**	left right	5	20	40	£13. 5. 0.	*m*
EV-854 **EV-855**	left right	5	40	40	£13. 5. 0.	*m*
EV-856 **EV-857**	left right	4	100	80	£16. 10. 0.	*m*

NOTE: The upper bank of tubes is left handed and the lower bank right handed.

EV-860 **Stoppers,** hollow blown glass, 19/26 cone with hooks for rubber tie ... ... Dozen £3. 8. 0. Each £0. 6. 10. *m*

EV-862 **Stopper ties,** rubber, for use with glass stoppers. Dozen packs £3. 14. 0. Pack of 12 £0. 7. 4. *m*

Upper phase dispensers, automatic, all glass with ball and socket connections.

List No.	**EV-870**	**EV-871**	**EV-872**	**EV-873**	
Capacity ml	10	20	40	80	
Each	68/–	68/–	68/–	68/–	*m*

Upper phase reservoir tubes, with ball joint to couple to automatic dispenser by means of connecting tubes EV-880 or EV-881.

List No.	**EV-876**	**EV-877**	
Capacity approx.	5	10 litres	
For units	3	6·5 ft	
Each	£8. 0. 0.	£11. 5. 0.	*m*

Reservoir connecting tubes, with ball and socket joints.

List No.	**EV-880**	**EV-881**	
For use with Nos.	EV-812 to EV-819	EV-820 and EV-821	
Each	£1. 14. 0.	£1. 14. 0.	*m*

EV-883 **Bank connecting tube,** with ball and socket joints, for connecting upper and lower banks on all stands except EV-820 and EV-821. Each £1. 5. 6. *m*

EV-884 **Bank connecting tube, short,** with ball and socket joints for stands EV-820 and EV-821 ... ... Each £1. 5. 6. *m*

EV-886 **Drain tube,** with ball socket joint... ... Each £0. 14. 0. *m*

EV-890 **Coupler,** bonded rubber, for drive connection between robot and stands ... ... Each £3. 10. 0. *m*

JR-260 **Joint clips,** sizes JC29 and JC19, for ball and socket joints. For prices see entry in List No. sequence.

COUNTERCURRENT APPARATUS

MICRO AUTOMATIC MODEL

For separations involving quantities of material from as little as 1 mg upwards.

The partition tubes employed are of similar design to the macro tubes but of smaller dimensions with lower and upper phase capacities of 1·5 or 3 ml each. They are designed to ensure efficient mixing, settling and transfer with negligible hold-up.

The tubes are robustly constructed in all-glass sets of ten tubes and are fitted with polythene stoppers. These sets are arranged in the shaking frame in 4 banks of either 30 or 60 tubes each. The frames are however of sufficient size to take an extra 10 tube set in each bank so that the total machine capacities can be extended to 160 or 320 tubes when required.

The apparatus can be powered by a standard drive robot EV-810 and may be used with automatic upper phase dispenser or recycling adapter tube. If automatic drive is not required, a handle is provided by which the apparatus may be manually operated.

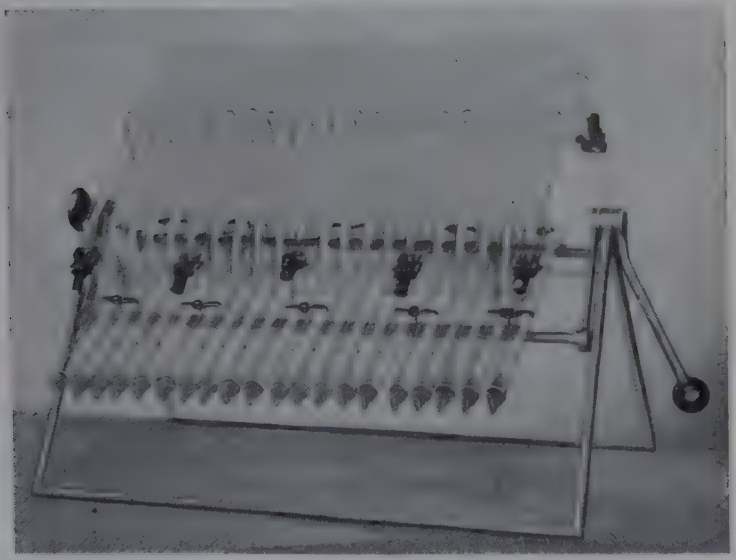
EXTRACTION STANDS, micro, Craig type, for use with drive robot EV-810. As specification, with four banks of tubes, polythene stoppers, recyling adapter and automatic upper phase dispenser.

When ordering please state capacity of upper phase dispenser required.

List No.	No. of tubes	Lower phase capacity ml	Maximum upper phase capacity ml	Nom-inal length cm	Each	
EV-900	120	1·5	3	90	**£309. 0. 0.**	*m*
EV-901	120	3	3	90	**£309. 0. 0.**	*m*
EV-902	240	1·5	3	200	**£541. 0. 0.**	*m*
EV-903	240	3	3	200	**£541. 0. 0.**	*m*

SMALL SCALE HAND OPERATED MODEL

For use by students and to demonstrate the principles of countercurrent extraction in universities and technical colleges.



EV-930

This model comprises 20 countercurrent tubes of the Craig-type, each tube of 20 ml lower and upper phase capacity, mounted on a stove enamelled stand together with an automatic upper phase dispenser and reservoir. A friction lock is provided to hold the tube rack at the desired settling angle.

At each tipping operation, the upper phase dispenser is filled automatically and on the return to the horizontal position an accurately measured portion of the upper phase is discharged into the first partition tube.

EV-930

COUNTERCURRENT APPARATUS, Craig type hand operated, as specification. Complete with 20 partition tubes, each 20 ml capacity for upper and lower phases and 20 ml automatic upper phase dispenser.
Each **£78.15. 0.** *m*

REPLACEMENT PARTS

EV-932	**Partition tube units,** consisting of 5 tubes of borosilicate glass all sealed together and fitted at connecting ends with ball and socket joints. Capacity 20 ml each upper and lower phases. Without stoppers.	Each **£13. 5. 0.**	*m*
EV-933	**Upper phase dispenser, automatic,** all glass with ball and socket connections, capacity 20 ml.	Each **£2.16. 0.**	*m*
EV-934	**Upper phase reservoir,** capacity about 500 ml.	Each **£2.16. 0.**	*m*
EV-935	**Drain tube**	Each **£0.15. 6.**	*m*
JR-260	**Joint clips,** sizes JC29 and JC19. For prices see entries in List No. sequence.		

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FATS determination see DAIRY PRODUCTS
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FILTRATION

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Glass wool see GLASS SUNDRIES

CARLSON-FORD FILTER SHEETS

FOR CLARIFICATION AND STERILISATION

STERILISATION

The sterilising grades are specially treated asbestos filter sheets, which remove deposits by adsorption. A sheet made of asbestos alone would give extremely bright and sterile filtrates, but the compact mass formation of the material would give slow filtration. Therefore, since adsorbants retain particles by attraction and not by obstruction, it is possible to 'blend' the asbestos with carefully selected grades of cellulose, a substance of high porosity having excellent filtration qualities. This results in a sheet combining the properties of adsorption and filtration.

CLARIFICATION

This specially treated asbestos, by virtue of its adsorptive effect, possesses the ability to remove certain colloids. This is particularly useful in removing the troublesome 'haze' from otherwise clear filtrates. The cellulose fibres increase the life of the sheet, since the precipitated colloidal matter would rapidly block the pores of a pure asbestos sheet.

CHOICE OF SHEETS

The range of filter sheets, varying from high asbestos to high cellulose content, will deal with a large variety of filtration problems, including the removal of reasonable amounts of colloidal matter. A liquid, which is infected with bacteria and contains foreign particles not smaller than fully developed yeast cells, should filter through one of the sterilising grades at a low pressure differential, in the region of 1·05 kg/cm^2. If the pressure difference remains steady for a long period, rising only appreciably when the solid matter removed has formed a complete film over the filtration surface, the lowest asbestos content filter sheet, giving a star-bright, stable and sterile filtrate, may be used. If the pressure tends to rise quickly during a test run when the initial flow rate is maintained, or, if in order to maintain equilibrium between pressure and flow rate, a grade of filter sheet has to be used which produces non-sterile, non-stable (i.e. haze on standing), or hazy filtrates, it may be safely assumed that unstable colloidal matter is present, provided that the liquid does not contain abnormal amounts of suspended matter.

LARGE QUANTITY FILTERING

Asbestos filter sheets may be used with a Buchner funnel when filtering large quantities of liquids. One application is the clarification of broth and other media with a coarse clarifying grade such as 2A.

HIGH PURITY FILTER SHEETS

Asbestos is a naturally occurring fibre. The chrysotile type of asbestos is the grade most suitable for filtration purposes and this, chemically, is mainly pure magnesium silicate. There are, however, traces of other silicates present within the mineral lattice which can be found by normal methods of analysis. They do not affect liquids being filtered.

There is, in addition, the possibility of free magnesium, calcium or iron bases being present, these being derived from the gangue from which the crude asbestos is mined, and this will cause an increase in the pH value of the liquid being filtered. The fibre, therefore, is treated by a special process of acid washing which reduces the pH change to a minimum.

Sheets so treated are known as 'High Purity' sheets and are identified by the prefix HP/ before the grade designation.

TO OBTAIN THE BEST RESULTS

STERILITY

To ensure sterility of a filter dressed with asbestos filter sheets, the whole unit with the sheet or sheets loosely in position should be put in an autoclave and maintained at 1·05 kg/cm^2 steam pressure for 30 min. In the event of steam being passed through the filter for this purpose, the static pressure **must not exceed 0·35 kg/cm^2 (5 lb/in^2).**

AIRLOCK PREVENTION

After cooling, the liquid should be fed very slowly to the filter so that all parts of the filter sheets are fed simultaneously. This method prevents the formation of airlocks, which would otherwise lower the efficiency of the filter.

PRESSURE

For successful results the pressure must be carefully regulated and should pe kept as low as practicable. The pressure difference between the inlet and the outlet side of the filter must be kept low. **It is recommended that this pressure difference should not exceed 1·05 kg/cm^2 (15 lb/in^2) when sterile filtration is required.**

Oscillation in the flow of liquid can upset the filtrate temporarily, and it is urged that a steady pressure be maintained throughout the process.

CARLSON-FORD FILTER SHEETS

For Clarification and Sterilisation (continued)

As a result of experience we have found the following grades fill most laboratory needs. These grades are stocked in four sizes, 3·6, 6 and 14 cm circles and 20 cm squares. Filtering details are as follows :—

GRADES FOR STERILISATION

Grade	Resistance to bacteria and yeasts	General description of uses
HP/PYR	Complete	This sheet was developed with the aid of scientists in the pharmaceutical industry for the removal of pyrogens by filtration
HP/EKS2	Complete	A sterilising grade of sheet developed for filtering liquids heavily infected with minute organisms
HP/EKS	Complete	Absolute sterility is guaranteed with this grade when used under controlled standard conditions. It has a faster flow rate than HP/EKS2
HP/EK	Down to removal of B. prodigiosus	This grade, when used with carefully controlled techniques, will give absolute sterility, but the filtrate will then retain the activity from viruses, toxins, antitoxins, etc., which may be the main interest in the filtrate
HP/S10	Down to removal of B. prodigiosus	This is the universal 'polishing' grade of sheet from which good throughput coupled with a high degree of biological stability is obtained

GRADES FOR CLARIFICATION

Grade	Resistance to bacteria and yeasts	General description of uses
4	Removes yeasts	A rapid fine clarifier for use where speed is essential
2A	—	General clarification of all types of liquid under pressure or gravity
O	—	A very fast filter sheet with special uses, e.g., food extracts, viscous liquids, etc.

FILTER SHEETS, CARLSON-FORD

List No.	Grade	Box of 25 circles			Box of 50 Box of 50 squares	
		3·6 cm	6 cm	14 cm	20 × 20 cm	
FC-030	HP/PYR	**3/9**	**6/–**	**16/–**	**37/6**	m
FC-032	HP/EKS2	**3/9**	**6/–**	**16/–**	**37/6**	m
FC-034	HP/EKS	**3/9**	**6/–**	**16/–**	**37/6**	m
FC-036	HP/EK	**3/9**	**6/–**	**16/–**	**37/6**	m
FC-038	HP/S10	**3/9**	**6/–**	**16/–**	**37/6**	m
FC-048	4	**3/6**	**5/6**	**13/–**	**33/4**	m
FC-050	2A	**3/6**	**5/6**	**13/–**	**33/4**	m
FC-052	O	**3/6**	**5/6**	**13/–**	**33/4**	m
FD-482	EKS	18 mm circles. For prices see entry in List No. sequence.				

For bacteriological filters, in which asbestos filter sheets may be used, see FD-420 to FD-480.

FC-060

FILTER SHEETS, *Carlson-Ford*, 20 × 20 cm, with holes, for use with filter presses FD-020 to FD-062.

Grade	HP/PYR	HP/EKS2	HP/EKS	HP/EK	
Box of 50	**37/6**	**37/6**	**37/6**	**37/6**	m
Grade	HP/S10	4	2A	O	
Box of 50	**37/6**	**33/4**	**33/4**	**33/4**	m

Please state grade required.

FC-070

FILTER SHEETS, *Carlson-Ford*, 14 cm dia., with holes, for use with filter press FD-080.

Grade	HP/PYR	HP/EKS2	HP/EKS	HP/EK	
Box of 25	**16/–**	**16/–**	**16/–**	**16/–**	m
Grade	HP/S10	4	2A	O	
Box of 25	**16/–**	**13/–**	**13/–**	**13/–**	m

Please state grade required.

All items on this page normally available from stock.

WHATMAN FILTER PAPERS

PRIMARY EXPLANATION OF GRADES

Qualitative grades, Nos. GP, 1, 2, 3, 4 and 6. For filtration purposes where a low ash content is not required.

GP is a schools grade paper in circles up to 18·5 cm in packs of 1000 only.

No. 1 is the most widely used for all general laboratory filtrations and qualitative analysis.

No. 6 is a high retention paper similar to the former No. 5 but with a smoother surface.

Folded papers, Nos. 2V, 15 and 111V.

No. 2V is a No. 2 grade paper folded ready for use and formerly known as No. 12.

No. 15 is a special purpose paper intended for agar-agar filtration.

No. 111V is a No. 111 grade paper folded ready for use and formerly known as No. 13.

Low ash grades, Nos. 30, 31 and 32. These papers have a sufficiently low ash content for gravimetric analysis, where the lowest ash content is not necessary.

No. 30 is the standard paper for rough quantitative work.

Ashless grades, Nos. 40, 41, 42 and 44. These papers are for use in accurate gravimetric analysis.

No. 40, with medium retention and filtration speed, is the general purpose paper for gravimetric work.

Hardened grades, Nos. 50, 52 and 54. These papers have great wet strength and resistance to acid and alkali solutions, but do not contain any synthetic wet-strengthening resins. The hard smooth surface allows the removal of fine precipitates from the paper, particularly after suction filtration, by scraping or vigorous washing.

No. 52, with medium retention and filtration speed, is the general purpose hardened grade.

No. 50 is a very smooth surfaced paper which may be used when the removal of slimy biological suspensions from the paper after filtration is necessary.

No. 54 is an open-textured filter paper which may be used in filter presses as a pre-filter to remove coarse particles prior to filtration through a sterilising mat, or as an after-filter to prevent fibres from the sterilising mat passing into the filtrate.

Hardened, ashless grades, Nos. 540, 541, 542 and 544. These papers, with very low ash content, correspond to the standard ashless grades, but the hardening process makes them particularly useful for gravimetric analysis in which strong acid or alkaline solutions are used.

High wet-strength grades, Nos. 90, 111 and 115. These papers contain a small amount of a stable additive to impart a high wet strength, unlike the corresponding hardened grades which are chemically treated and contain no binders. The presence of additive is rarely significant except when accurate determination of nitrogen is involved. No. 90 is a very fast filtering paper suitable for gelatinous precipitates.

Specialities include accelerators, ashless tablets, ashless floc, spot test paper, seed test paper and several grades of glass fibre filter papers.

PACKAGING

Circles are packed in boxes of 100 (except GP and thick grades) in standard sizes from 4·25 to 50·0 cm. These boxes up to 18·5 cm are further packed 10 to a carton (1000 circles). The average ash weight per circle and an indication of its intended use are marked on each box. Sheets are stocked in packets of 100 in size 46 × 57 cm and are available to order in size 58 × 68 cm.

EDUCATIONAL TERMS

Whatman filter papers purchased by college and hospital stores are subject to a discount of 10% against written official orders marked 'for resale to students at list prices net.'

WEIGHTS OF PAPER AND ASH

Grade No.	Weight g/100 cm²	Ash (average)	
		%	mg/100 cm²
1	0·87	0·06	0·52
2	0·97	0·06	0·58
3	1·85	0·05	0·92
4	0·92	0·06	0·55
6	1·00	0·06	0·60
30	0·95	0·025	0·24
31	0·91	0·025	0·23
32	1·00	0·025	0·25
40	0·95	0·01	0·09
41	0·91	0·01	0·09
42	1·00	0·01	0·10
44	0·80	0·01	0·08
50	1·00	0·025	0·25
52	1·00	0·025	0·25
54	0·93	0·025	0·23
90	1·00	0·06	0·60
111	0·75	0·06	0·45
115	0·75	0·06	0·45
540	0·88	0·008	0·07
541	0·82	0·008	0·06
542	1·00	0·008	0·08
544	0·80	0·008	0·06

WHATMAN FILTER PAPERS

(continued)

RELATIVE FILTRATION RATES, RETENTIVITY AND PORE SIZES

Classification	Fast			Fast-Medium	Medium	Slow	
Retaining properties	Coarse particles			Medium particles		Fine particles	
Mean pore size, microns	5·0 to 3·4			2·8 to 2·1	2·9 to 1·4	1·1 to 0·4	
Relative filtration times	4–5	6–8	9–12	20–30	35–50	100–130	140–160
Qualitative grades		4		1	2, 3		6
Qualitative wet strength grades	90				111		115
Low ash grades			31		30	32	
Ashless grades			41		40	44	42
Hardened grades		54			52		50
Hardened ashless grades		541			540	544	542

TYPICAL APPLICATIONS

Application	Qualitative	Wet strength	Low ash	Ashless	Hardened	Hardened ashless	REMARKS
General purposes medium precipitates	1 & 2†	111	30	40	52	540	†2 is the more retentive
$BaSO_4$ (Well precipitated)	2	111	30	40 & 44†	52	540, 544†	†44 and 544 are the more retentive
$BaSO_4$ (Fine suspension)	6	115	32	42	50	542	All are highly retentive
Silica (Coarse)	4	90	31	41	54	541	
Silica (Fine)	2	111	30	40	52	540	If a more retentive paper is required, use as for $BaSO_4$ (Fine suspension)
Iron and aluminium hydroxides	4	90	31	41	54	541	
Calcium oxalate	—	111	30	40	52	540	
Metastannic acid	6	115	32	42	50	542	
Ammonium magnesium orthophosphate	1 & 2	111	30	40	52	540	
Phosphomolybdic acid (Yellow ppt)	—	111	30	40	52	540	All these grades specially designed for this work.
Buchner funnels	6	111, 115	32	42	All hardened grades		
Assay of gold, etc.	—	—	—	44	—	544	
Caustic solutions	—	—	—	—	All hardened grades		
Agar-agar	15	—	—	—	—	—	
Gelatinous biological ppts.	—	90	—	—	—	—	

For **FOLDED PAPERS** see pages 266 and 267 **WHATMAN SPECIALITIES** see page 266
WHATMAN PAPER FOR CHROMATOGRAPHY see **CHROMATOGRAPHY**

WHATMAN FILTER PAPERS

(continued)

List No.		FC-200	FC-205	FC-210	FC-220	FC-230	FC-240	FC-245	FC-250	FC-255	FC-260	FC-265	
Circles dia. cm	Grade	1	2	3	4	6	30	31	32	40	41	42	
	Qty.												
4·25	1000	8/6	9/3	17/–	11/–	11/–	16/6	16/6	16/6	25/–	25/–	25/–	d
	100	2/6	2/7	3/4	2/9	2/9	3/3	3/3	3/3	4/–	4/–	4/–	
5·5	1000	10/9	11/9	22/–	12/6	12/6	22/–	22/–	22/–	34/–	34/–	34/–	d
	100	2/9	2/10	3/9	2/11	2/11	3/9	3/9	3/9	4/10	4/10	4/10	
7·0	1000	12/3	15/–	28/–	14/9	14/9	28/–	28/–	28/–	45/–	45/–	45/–	d
	100	2/10	3/1	4/3	3/1	3/1	4/3	4/3	4/3	5/10	5/10	5/10	
9·0	1000	16/–	20/–	37/–	20/–	20/–	37/–	37/–	37/–	64/–	64/–	64/–	d
	100	3/2	3/7	5/2	3/7	3/7	5/2	5/2	5/2	7/6	7/6	7/6	
11·0	1000	20/–	27/–	47/–	29/6	29/6	48/–	48/–	48/–	78/–	78/–	78/–	d
	100	3/7	4/2	6/–	4/5	4/5	6/2	6/2	6/2	8/9	8/9	8/9	
12·5	1000	24/6	34/–	56/–	37/–	37/–	60/–	60/–	60/–	92/–	92/–	92/–	d
	100	3/11	4/10	6/10	5/2	5/2	7/2	7/2	7/2	10/–	10/–	10/–	
15·0	1000	34/–	45/–	82/–	49/–	49/–	84/–	84/–	84/–	114/–	114/–	114/–	d
	100	4/10	5/10	9/3	6/2	6/2	9/3	9/3	9/3	12/6	12/6	12/6	
18·5	1000	52/–	66/–	116/–	70/–	70/–	125/–	125/–	125/–	160/–	160/–	160/–	d
	100	6/6	7/8	12/9	8/–	8/–	13/6	13/6	13/6	17/6	17/6	17/6	
24·0	100	9/–	11/6	20/–	12/9	12/9	21/6	21/6	21/6	27/–	27/–	27/–	d
32·0	100	16/9	20/6	37/–	24/–	24/–	—	—	—	—	—	—	d
40·0	100	25/6	32/–	62/–	36/–	36/–	—	—	—	—	—	—	d
50·0	100	39/–	49/–	90/–	55/–	55/–	—	—	—	—	—	—	d
Sheets 46×57	500	150/–	—	—	—	—	—	—	—	—	—	—	d
	100	32/6	46/–	70/–	56/–	56/–	—	—	—	—	—	—	d

List No.		FC-275	FC-280	FC-290	FC-295	FC-296	FC-297	FC-298	FC-300	FC-305	FC-310	FC-315	
Circles dia. cm	Grade	44	50	52	54	90	111	115	540	541	542	544	
	Qty.												
4·25	1000	25/–	—	—	—	—	—	—	25/–	25/–	25/–	25/–	d
	100	4/–	—	—	—	—	—	—	4/–	4/–	4/–	4/–	
5·5	1000	34/–	—	—	—	—	—	—	34/–	34/–	34/–	34/–	d
	100	4/10	—	—	—	—	—	—	4/10	4/10	4/10	4/10	
7·0	1000	45/–	38/–	38/–	38/–	21/–	17/–	17/–	45/–	45/–	45/–	45/–	d
	100	5/10	5/2	5/2	5/2	3/8	3/4	3/4	5/10	5/10	5/10	5/10	
9·0	1000	64/–	54/–	54/–	54/–	28/–	22/–	22/–	64/–	64/–	64/–	64/–	d
	100	7/6	6/8	6/8	6/8	4/3	3/9	3/9	7/6	7/6	7/6	7/6	
11·0	1000	78/–	68/–	68/–	68/–	37/–	26/6	26/6	78/–	78/–	78/–	78/–	d
	100	8/9	7/10	7/10	7/10	5/2	4/2	4/2	8/9	8/9	8/9	8/9	
12·5	1000	92/–	82/–	82/–	82/–	47/–	33/–	33/–	92/–	92/–	92/–	92/–	d
	100	10/–	9/3	9/3	9/3	6/–	4/9	4/9	10/–	10/–	10/–	10/–	
15·0	1000	114/–	104/–	104/–	104/–	66/–	43/–	43/–	114/–	114/–	114/–	114/–	d
	100	12/6	11/6	11/6	11/6	7/8	5/8	5/8	12/6	12/6	12/6	12/6	
18·5	1000	160/–	145/–	145/–	145/–	98/–	62/–	62/–	160/–	160/–	160/–	160/–	d
	100	17/6	16/–	16/–	16/–	10/9	7/4	7/4	17/6	17/6	17/6	17/6	
24·0	100	27/–	—	—	—	17/6	11/6	11/6	27/–	27/–	27/–	27/–	d
32·0	100	—	—	—	—	—	—	—	46/–	46/–	46/–	46/–	d
40·0	100	—	—	—	—	—	—	—	68/–	68/–	68/–	68/–	d
50·0	100	—	—	—	—	—	—	—	100/–	100/–	100/–	100/–	d
Sheets 46×57	100	—	—	—	—	—	—	—	130/–	130/–	130/–	130/–	d

All items on this page normally available from stock.

WHATMAN SPECIALITIES

FC-500

FILTER PAPERS, *Whatman,* **G.P.** Schools grade, in cartons of 1000 circles.

Dia.	9	11	12·5	15	18·5 cm	
Carton	**10/6**	**13/–**	**15/3**	**19/6**	**27/6**	*d*

FC-512

FILTER PAPERS, FOLDED, *Whatman,* **No. 2V.** Made from the same paper as *Whatman* No. 2.

Dia.	12·5	15	18·5	24	32	40	50 cm	
Box of 100	**7/8**	**9/5**	**12/4**	**17/5**	**28/6**	**40/–**	**54/6**	*d*

FC-514

FILTER PAPERS, FOLDED, *Whatman,* **No. IIIV.** Made from the same paper as *Whatman* No. 111.

Dia.	12·5	15	18·5	24	32	40	50 cm	
Box of 100	**7/7**	**9/2**	**12/–**	**17/–**	**26/6**	**37/6**	**52/–**	*d*

FC-515

FILTER PAPERS, FOLDED, *Whatman,* **No. 15.** For agar-agar filtration.

Folded squares, 32 cm	...	Box of 50	**£0. 18. 6.**	*d*
Folded squares, 50 cm	...	Box of 25	**£1. 2. 0.**	*d*

FC-530

ASHLESS TABLETS, *Whatman.* Made from ashless material, each tablet 3·85 cm dia., with approximate weight 2·4 g and ash content approximately 3 mg. Easily dispersed in water. Used for large scale filtration of gelatinous precipitates, or where a bulk supply of filter aids is necessary for a batch of small scale precipitations. Supplied in tubes of 50 tablets.
5 tubes **£1. 9. 0.** Tube **£0. 6. 6.** *d*

FC-535

ACCELERATORS, *Whatman.* Similar to FC-530, but smaller, each disk 1·95 cm dia. with approximate weight 0·4 g and ash content approximately 0·06 mg. May be used singly for small scale precipitations. Supplied in tubes of 50 tablets.
5 Tubes **£0. 11. 0.** Tube **£0. 2. 6.** *d*

FC-540

ASHLESS FLOC, *Whatman,* for use as a filter aid or for preparation of filter pulp beds in conical or Buchner funnels. The floc resembles dry dispersed pulp and is supplied in polythene film bags within a cardboard box.
100 g Pkt. **£0. 5. 6.** *d*

FC-550

SPOT TEST PAPER, *Whatman,* **No. 120.** A thick dense double ashless paper for use in inorganic 'spot-testing'. Fluids are rapidly absorbed with a minimum of surface spread. Supplied in packets of 25 sheets 22×14 cm ... 4 Pkts. **£1. 0. 0.** Pkt. **£0. 6. 0.** *d*

FC-570

FILTER PAPER CLIPPINGS, *Whatman,* 'Ordinary'.
500 g Pkt. **£0. 4. 6.** *d*

FC-575

FILTER PAPER CLIPPINGS, *Whatman,* 'Ashless'.
500 g Pkt. **£0. 11. 6.** *d*

FC-620

SEED TEST PAPERS, *Whatman.* Used in horticultural laboratories for testing the fertility of seeds. In circles of 9 cm dia, and thickness approx. 0·4 mm.
Box of 100 **£0. 4. 0.** *d*

FC-640

GLASS FIBRE FILTER TUBES. See Addenda.

WHATMAN GLASS FIBRE FILTER PAPERS

These papers are extremely retentive, yet are much faster than most cellulose papers. They are made of fine borosilicate glass fibres and contain no cellulose, but in spite of their fine structure, they have great wet strength. They can be used in any type of flat surfaced filtering device, such as Gooch crucibles, Hirsch and Buchner funnels etc. By using a circle of glass filter paper on a coarse porosity filter crucible, the rapid filtration of very fine precipitates and semi-colloidal substances may be achieved without blockage of the fritted glass. As the papers contain no binder they will withstand most laboratory reagents in standard concentrations and can be heated to 500°C.

The papers may be used in the removal of gels from resin polymer syrups. They have many other uses, such as the location of substances by charring in chromatography, high voltage electrophoresis, and separations relying on the apparent non-adsorption of proteinaceous compounds by the paper. Rectangular sheets for chromatographic purposes are classified as Whatman Chromedia and will be found under List Nos. CL-294 to CL-296 in List No. sequence.

FC-650

FILTER PAPERS, GLASS FIBRE, *Whatman,* **GF/A.** Made from glass fibres of 0·5 μ dia. A very fast, thin filter, about 0·2 mm thick, with very high retention properties.

FC-660

FILTER PAPERS, GLASS FIBRE, *Whatman,* **GF/B.** Made from glass fibres of 0·5 μ dia. The filter is about 0·65 mm thick, and therefore not so fast as FC-650, but more retentive.

FC-670

FILTER PAPERS, GLASS FIBRE, *Whatman,* **GF/C.** Made from glass fibres of less than 0·5 μ dia. An ultra-fine filter of thickness about 0·2 mm, with retention properties greater than FC-660.

FILTER PAPERS, GLASS FIBRE CIRCLES.

List No.	**FC-650**	**FC-660**	**FC-670**	
Grade	GF/A	GF/B	GF/C	
Dia. cm	Box of 100			
2·1	**8/8**	**11/8**	**9/5**	*d*
2·5	**9/–**	**12/–**	**9/9**	*d*
3·7	**9/8**	**14/9**	**11/3**	*d*
4·25	**10/6**	**17/2**	**12/9**	*d*
5·5	**12/4**	**22/5**	**16/2**	*d*
7·0	**14/6**	**31/–**	**21/–**	*d*
9·0	**19/–**	**43/–**	**29/–**	*d*
11·0	**25/–**	**54/–**	**40/–**	*d*
12·5	**30/–**	**77/–**	**50/–**	*d*

GK-150 **GAUZE, nylon**
GR-150 **GLASS WOOL**
GR-160 **QUARTZ WOOL**
} for filtration purposes
see entries in List No. sequence

All items on this page normally available from stock.

GREEN'S FILTER PAPERS

FC-700

FILTER PAPERS, *Green's* **No. 795.** A standard laboratory paper for qualitative work. With rapid filtration characteristics, it is suitable for tinctures, aqueous and salt solutions.

Dia.	7	9	11	15	18·5 cm	
1000 circles	**11/9**	**16/6**	**22/–**	**41/–**	**56/–**	*d*
100 circles	**2/10**	**3/3**	**3/9**	**5/6**	**6/10**	

Dia.	24	32	38·5	50 cm	
1000 circles	**88/–**	**175/–**	**235/–**	**330/–**	*d*
100 circles	**9/9**	**19/–**	**25/6**	**36/–**	

FC-705

FILTER PAPERS, *Green's* **No. 401.** For the use of students, and other general qualitative work. This thin paper has a medium rate of filtration, retaining all but the finer types of precipitate.

Dia.	7	9	11	15	18·5	24 cm	
1000 circles	**8/6**	**12/6**	**16/6**	**25/–**	**41/–**	**53/–**	*d*
100 circles	**2/6**	**2/11**	**3/3**	**4/–**	**5/6**	**6/6**	

FC-710

FILTER PAPERS, *Green's* **No. 904.** A fast, hardened paper, resistant to acid and alkali solutions, and suitable for qualitative work.

Dia.	9	11	15	18·5	24 cm	
Pkt. of 100	**5/1**	**6/6**	**9/4**	**16/–**	**24/8**	*d*

Dia.	32	38·5	50 cm	
Pkt. of 100	**44/2**	**55/11**	**85/8**	*d*

FC-715

FILTER PAPERS, *Green's* **No. 904½, folded.** Made from the same paper as FC-710, for filtering agar-agar. Although the paper is thinner than other agar-agar papers, it is much stronger when wet, so that a faster rate of filtration is obtained with no fear of the paper collapsing.

Dia.	15	18·5	24	32	38·5	50 cm	
Pkt. of 100	**17/11**	**24/9**	**35/5**	**54/11**	**68/9**	**100/9**	*d*

FC-730

FILTER PULP, *Green's* **No. 301.** Chemically free from all bleach alkali and other impurities. Ash content 0·6%. Supplied in sheets approx. 60×30×0·2 cm., approx. 6 sheets/lb.

Approx. weight	7	28 lb	
Pack	**36/–**	**138/6**	*d*

Details and prices of other grades of *Green's* **filter papers on application.**

POSTLIP FILTER PAPERS

FC-750

FILTER PAPERS, *Postlip.* A thin white, chlorine-free paper, for use in schools, etc.

Dia.	7	9	11	15	18 cm	
Ash per circle	0·42	0·69	1·03	1·91	2·77 mg	
1000 circles	**9/3**	**11/9**	**15/6**	**25/–**	**33/–**	*d*
100 circles	**2/7**	**2/10**	**3/2**	**4/–**	**4/9**	

Dia.	24	30·5	39·5	51 cm	
Ash per circle	5·8	9·27	16·1	29·7 mg	
1000 circles	**53/–**	**80/–**	**125/–**	**190/–**	*d*
100 circles	**6/6**	**9/–**	**13/9**	**21/–**	

FC-752

FILTER PAPERS, *Postlip*, supplied in sheets.

Thickness	Size	Price 250 sheets	
Thin	17·5×22·5 in	**42/9**	*d*
Thin	24 ×24 in	**63/–**	*d*
Medium	24·5×24·5 in	**89/–**	*d*

Technico FILTER PAPERS
REGD. TRADE MARK

FC-770

FILTER PAPERS, *Technico.* A good reliable white paper suitable for school use, 11 cm dia.
Pkt. of 1000 **£0. 9. 6.** *d*

FC-772

FILTER PAPERS, *Technico,* as FC-770, but supplied in sheets 60×60 cm (24×24 in). Pkt. of 500 **£5. 8. 6.** *d*

FILTER PAPER CASE, see FV-245 in List No. sequence.

All items on this page normally available from stock.

FILTER PRESSES

FILTER PRESSES

Filter presses are required to work under so many varied conditions, that it is not possible to give a comprehensive list. However, two versatile presses and pressure vessels are described in some detail, and other presses and filtration units, each of which consists of a mobile stand carrying a press above a pump and motor, can be supplied to the customer's specifications. Filtering media available include filter sheets, woven fabrics, diatomaceous earth and plastics. Applications include sterilisation and clarification of pharmaceutical products, wines, spirits, cordials and fruit juices, and the filtration of corrosive liquids such as electro-plating solutions. Enquiries for filter presses should include as much of the following information as possible to enable us to offer the most suitable equipment.

A. **Product to be filtered** (description).
Filtration temperature.
Liquid to be filtered (description).
Viscosity at filtration temperature. Acidity or alkalinity (pH).
Volatile, poisonous or inflammable.
Insoluble matter to be removed (description).
Density, % solid in product by volume, % by weight.
Physical nature (granular, gelatinous, etc.).
Size of particles: average, maximum and minimum.

B. **Filtration requirements**
Is solid, liquid or both required? Size of smallest particle to be removed? Is liquid to be clear, bright or 'super bright'? Are filter aids permissible? If solid is required, maximum % residual liquid permissible in filter cake. Maximum filter inlet fluid pressure. Maximum back pressure at filter outlet. Are bacteria or yeast cells to be removed?

Complete sections 1, 2 or 3.

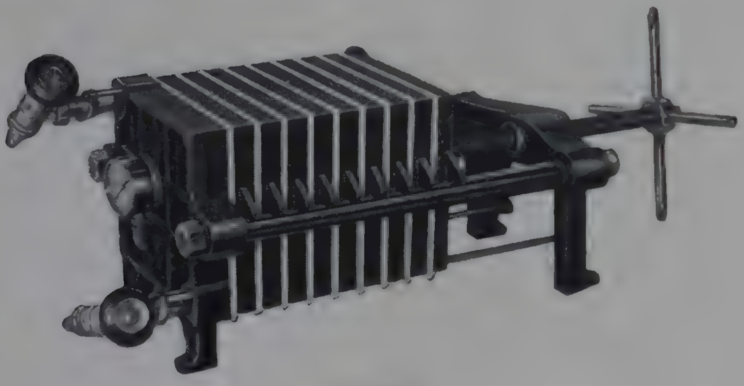
1. Continuous filtration where the flow must be maintained above a minimum value.
Average and minimum flow rate required. Time before filter is serviced.

2. Batch filtration where a bulk quantity is handled.
Total volume to be filtered in one operation and time allowed.

3. Known requirements resulting from previous experience.
Filtration area required, pressure drop across filter, total cake capacity, suitable filter media.

C. **Materials of construction**
Whether metal, rubber, or plastics are the most suitable.

D. **Pumping equipment**
Whether required. Suction against which pump will work. Power supply voltage, phase and frequency. Is compressed air available? Pressure? Is filter to be steam sterilised or autoclaved?



FD-020

FD-050

FILTER PRESS, PA20B.

An extremely versatile filter press, which gives the highest degree of sterility and clarification, yet is simple to assemble and operate. The aluminium alloy castings are lacquered for protection against weak corrosive chemicals and steam sterilisation. The end castings are held by chromium-plated steel bars of unequal diameter, so that the plates cannot be loaded incorrectly. Each accurately cast filter plate consists of a feed and solids storage chamber on one side and a ribbed drainage surface on the other. The stainless steel thrust screw, operated by an easily manipulated capstan handle, seals the assembled pack by compression. The raised surface of the ports and plate edges ensures a perfect seal round the holes and edges of the sheets, eliminating entirely the use of washers. The press is fitted with sight glasses, inlet pressure gauge, and valves which are chromium plated inside and out. A set of accessories is available for two stage filtration.

FD-020

FILTER PRESS, PA20B, as specification, to take a maximum of 10 plates and 11 filter sheets, 20 × 20 cm, with chamber depth 12·5 mm. Fitted with pressure gauge, two sight glasses, valves and nozzles. Complete with 10 filter plates ... ... Each **£91. 10. 0.** *f*

This filter is also available to take up to a maximum of 26 plates. A similar press is available in stainless steel for use when complete sterility is required. Full details on application.

ACCESSORIES

FD-030	**Filter plates**	Each **£3. 15. 0.**	*f*
FD-032	**Set of accessories** for two stage filtration consisting of transfer plate, pressure gauge and moving head.	Set **£20. 10. 0.**	*f*
FC-060	**Filter sheets,** *Carlson-Ford,* 20 × 20 cm, with holes. For details and prices see entry in List No sequence.		

FD-050

PRESSURE VESSEL, 5 litre, with a maximum working pressure of 0·7 kg/cm² (10 lb/in²), for use with filter press FD-020. The vessel, of mild steel with welded joints and malleable cast iron lid, is heavily tinned on the inside against corrosion. Fitted with pressure gauge, safety valve, vent cock and Schrader valve for pressurising, with outlet cock and nozzle at the base. Each **£47. 10. 0.** *mS*

Items on this page coded S normally available from stock.

FILTER PRESS

A useful size of filter which can be fitted with up to 7 filter plates (and later be extended to a total of 23 plates) each 20 × 20 cm. Although mainly intended for pressure filtration, owing to the low overall height of the press, it is also convenient for gravity filtration. The filter plates are of lacquered aluminium alloy and inlet and outlet connections are of silver-plated lead-free bronze.

Designed so that it may be sterilised by steam or by autoclaving, the press is available both as a free-standing table model or mounted on a trolley on which a pump can also be mounted. By the addition of a change-over plate, double filtration can be effected in a single operation.

Dimensions

Table model	80 × 45 × 45 cm high
Trolley mounted	80 × 56 × 92 cm high

FD-060

FILTER PRESS, Pilot Princess, table mounting, as specification. Supplied with 3 plates to accept 4 filter sheets ... ... Each **£113. 17. 6.** *f*S

FD-062

FILTER PRESS, Pilot Princess, trolley mounted, as specification. Supplied with 3 plates to accept 4 filter sheets ... ... Each **£109. 15. 6.**

When ordering filter presses please state whether sterilisation is to be by steam or autoclaving.

ACCESSORIES

FD-064	**Spare plates;** may be added in pairs to a total of 7 plates.	Pair **£13. 8. 0.**	*f*
FD-066	**Change-over plate,** for double filtration.	Each **£33. 0. 0.**	*f*

For *Carlson-Ford* filter sheets, 20 × 20 cm, for FD-060 and FD-062 see FC-060 in List No. sequence.

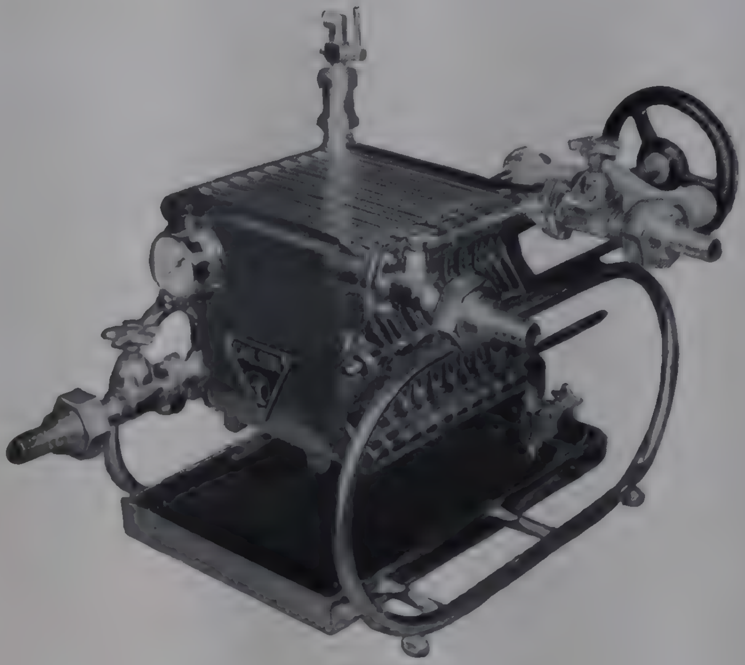
NOTE: Pilot Princess filter presses are alternatively available in stainless steel. Also, extension rods are available to allow totals of 15 or 23 plates. Details and prices on request.

ALL-GLASS FILTER PRESS

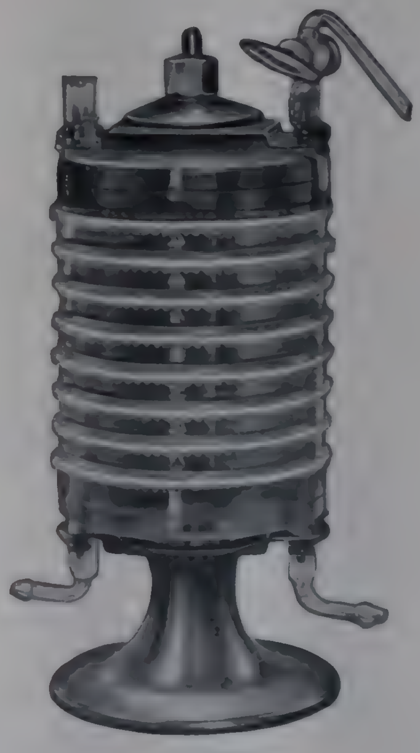
This all-glass filter press is widely used for the filtration of biological products, where the utmost cleanliness and sterility of the liquids combined with freedom from metallic contamination is essential. The specially toughened glass, with a shock temperature range of 90°C, allows the filter to be cleaned and sterilised by autoclaving or steaming. Each plate combines a feed chamber on one side with a ribbed drainage surface on the other. The accurately ground edges of the plates form joints with the sheets round the rim, the feed and drainage holes, and the centre stainless steel bolt. A plated guard tube is slipped over the bolt to prevent chipping during assembly. A locating arrow on the edge of each plate ensures their correct arrangement, and two plastic rods are used to align the holes in the sheets and plates. The inlet and outlet adapters, bleed tap and stoppers, fitted by means of standard cone and socket joints to BS 572, are retained by stainless steel clips and thumbscrews, carried on stud plates top and bottom. A transfer plate is available for two-stage filtration.

FD-080

FILTER PRESS, PG14, All-glass as specification, to hold up to 8 filter sheets, 14 cm dia., on a plated metal stand, complete with guard tube, alignment rods, spanner and instructions ... ... Each **£81. 15. 0.** *f*



FD-060



FD-080

REPLACEMENT PARTS

FD-082	**Base plate, glass**	Each	**£10. 15. 0.**	*f*
FD-084	**Head plate, glass**	Each	**£10. 15. 0.**	*f*
FD-086	**Intermediate plate, glass** ...	Each	**£5. 5. 0.**	*f*
FD-088	**Stopper, glass**	Each	**£0. 5. 0.**	*f*
FD-090	**Angular cone adapter, glass** ...	Each	**£0. 13. 6.**	*f*
FD-092	**Bleed tap, glass**	Each	**£2. 19. 9.**	*f*

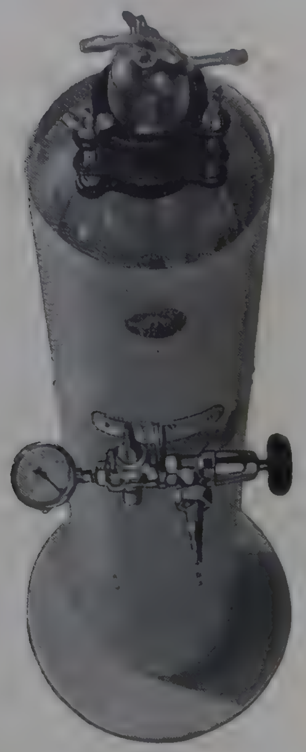
ACCESSORIES

FD-094	**Transfer plate,** or two-stage filtration.	Each **£5. 5. 0.**	*f*
FC-070	**Filter sheets,** *Carlson-Ford*, 14 cm dia., with holes. For details and prices see entry in List No. sequence.		
FD-100	**Pressure vessel,** all glass, see next page.		

The above press is also available in sizes to take 12 and 16 cm filter sheets. Details and prices on application.

Items on this page coded *S* normally available from stock.

ALL-GLASS PRESSURE VESSEL



FD-100

The vessel, with a maximum working pressure of 1·75 kg/cm² (25 lb/in²), is for use when pumping equipment is neither practical nor desirable, as with the all-glass filter press FD-080. The liquid, total volume 18 litres, is transferred by compressed air. The vessel, of specially toughened glass with a shock temperature range of 90°C, is mounted in thick shock-absorbing rings inside a perforated metal stand with a solid base. Chromium plated nozzles, valve, pressure gauge, and sealed safety valve, set at 1·75 kg/cm² (25 lb/in²), are fixed to the stand. The removable top cap is sealed to the vessel by rubber packed flange to protect the ground glass joint. The compressed air and liquid outlet glass nozzles, carried on the cap, are safe-guarded by a metal cover (not shown in illustration). The air-line connection between the controls and the cap is made by rubber tubing, and the siphon tube is of rubber or polythene. The latter cannot be heat sterilised.

FD-100

PRESSURE VESSEL, all-glass, 18 litre, as specification, tested to 7·0 kg/cm² (100 lb/in²), with stand and attached valves and pressure gauge, cover and internal shock absorbing rings. **Please specify whether a rubber or polythene siphon tube is required.** Polythene cannot be heat sterilised. Each **£78. 15. 0.** *fN*

Gallenkamp

METAL FILTER PUMPS

FD-210

FD-215 with FD-216

FD-210

FILTER PUMP, *Gallenkamp*, of plated metal. A low price pump recommended for general filtration purposes. With a water supply at 1·75 kg/cm² (25 lb/in²) the pump requires only 6 litres of water in approx. 100 sec to evacuate a 1 litre system to an ultimate vacuum of about 15 torr. Overall length 12 cm. With corrugated nozzle for pressure tubing connection to tap.
Dozen **£8. 15. 0.** Each **£0. 16. 0.** *b*

FD-215

FILTER PUMP, *Gallenkamp*, **high efficiency, chromium plated.** The water passes through a polypropylene nozzle into a small cavity where an annular space between the water jet and the cavity wall forms a low pressure region. This annular space, compared with the small area of the side arm in traditional pumps, provides the pump with its greatly enhanced efficiency. The water then proceeds through a venturi and finally to the vortex cavity and off-set outlet which ensure that the venturi remains full and so eliminates the need for an immersed tail pipe. An efficient non-return valve is fitted in the vacuum connection. Using a water supply at 1·75 kg/cm² (25 lb/in²) pressure, the pump requires only 3·5 litres of water to evacuate a 1 litre system to 15 torr, and such evacuation, owing to the high throughput rate, takes only 35 seconds. An ultimate vacuum of 12 to 15 torr is obtainable. Overall length 20 cm. For tubing connection to water tap ... Dozen **£16. 0. 0.** Each **£1. 9. 0.** *b*

ACCESSORY

FD-216 **Wing nut adapter** for connection to water taps with ½ in BSP thread male outlets. Comprises chromium plated insert with black corrosion-resistant wing nut and washer ... Dozen **£4. 0. 0.** Each **£0. 7. 10** *b*

REPLACEMENT PARTS

FD-217 **Spares kit** comprising 3 neoprene inserts for non-return valve and 12 neoprene washers for wing nut adapter ... ... Each **£0. 7. 6.** *b*

Items on this page normally available from stock except those coded *N*.

FILTER PUMPS AND ACCESSORIES

(continued)

FD-218
FILTER PUMP, glass, with non-return valve of acid resisting rubber. Dozen **£9. 0. 0.** Each **£0. 18. 2.** *m*

FD-220
FILTER PUMP, *Edwards*, black plastics, with integral non-return valve ... ... Each **£1. 4. 0.** *m*

FD-235
FILTER PUMP, *Edwards*, Model 7, stainless steel with combined ¼ in male BSP and tubing connector. An integral non-return valve is fitted... Each **£2. 14. 0.** *m*

FD-237
FILTER PUMP, *Edwards*, Model 8. As FD-235 but with ¼ in female BSP thread ... Each **£2. 14. 0.** *m*

REPLACEMENT PART
FD-239 **Valve inserts,** viton rubber, for pumps FD-235 and FD-237 ... ... Pack of 3 **£0. 11. 0.** *m*

ACCESSORY
FD-240 **Vacuum gauge,** with attachment for use with pumps FD-235, FD-237, scale 0–760 mm, 0–30 in Hg. Each **£2. 9. 0.** *m*

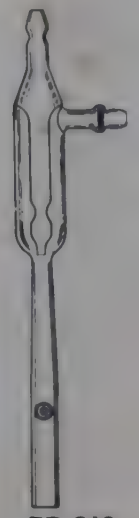
VACUUM GAUGES and stands, suitable for use with filter pumps, see GAUGES.

FD-250
FILTER PUMP, electrically operated. A reciprocating diaphragm pump with polypropylene body, neoprene diaphragm and silicone rubber valve, driven by a totally enclosed motor with integral fan cooling and on anti-vibration mountings. The whole is enclosed in a louvred metal case with inlet and exhaust tubulures for 8 mm bore flexible tubing and mains connecting cable. Vacuum 150 mm Hg. Pressure 1·4 kg/cm². Provides adequate suction for most laboratory filtration purposes with the advantage that the pump is of relatively chemical resistant materials. For 230/250V a.c. supplies only. Each **£25. 0. 0.** *m*

REPLACEMENT PART
FD-252 **Replacement parts kit** comprising cover gasket, ten inlet filter felts, ten valve washers, diaphragm and clamp ring ... ... Kit **£1. 0. 0.** *m*

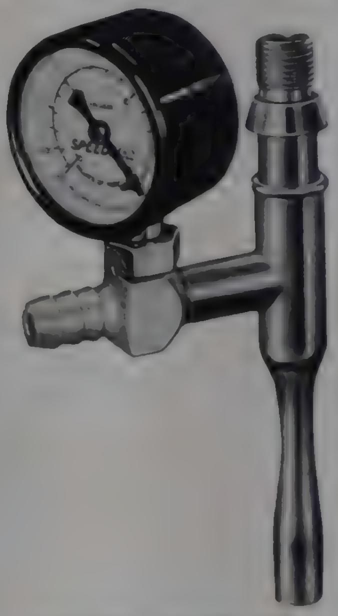
FD-255
NON-RETURN VALVE, polypropylene, for use with filter pumps ... Dozen **£1. 17. 0.** Each **£0. 4. 6.** *m*

***FD-260**
AIR INLET VALVE, for vacuum systems, plastics, with corrugated ends for tubing connection. Dozen **£3. 10. 0.** Each **£0. 7. 0.** c



FD-218

FD-220



FD-235 with FD-240

FD-250

FILTER PUMP TUBING SIZES

Rubber tubing List Nos. TX-520 et seq. is listed under BS 2775 size designations. The table below indicates which of these sizes are suitable for the vacuum and water outlet connections of the filter pumps and accessories listed above. The water inlet connection should preferably be of canvas reinforced tubing TX-635 or terylene reinforced PVC tubing TX-790.

List No.	Vacuum	Water	
		Inlet	Outlet
		mm	
FD-210	H8	9·5	N8
FD-215	,,	9·5	—
FD-218	,,	9·5	N10
FD-220	,,	12·5	N10
FD-235	,,	12·5	N10
FD-237	,,	—	N10
FD-240	,,	—	—
FD-255	,,	—	—
FD-260	,,	—	—

FD-255

FD-260

All items on this page normally available from stock.

Gallenkamp FILTER HOLDERS

FOR BACTERIOLOGICAL FILTRATION USING 5 cm FILTER MEMBRANES

Widely used to filter liquids for the separation or examination and analysis of particulate and biological matter. Typical fields of application include:

- **Water and sewage.**
- **Dairy products.**
- **Sugar and allied foodstuffs.**
- **Bacteriology, virology and mycology.**
- **Antibiotics and disinfectants.**
- **Marine biology.**
- **Fuels and oils.**
- **Beers, wines and soft drinks.**
- **Clinical fluids including blood, urine, spinal fluids and gastric and pleural washings.**

The filters are also used as one stage in the ultracleaning and sterilising of liquids.

FD-350

FD-356

FD-358

In a typical bacteriological test, the filter holder is sterilised by autoclaving and the membranes are sterilised by immersing in boiling water. For each sample a fresh membrane is inserted into the holder (observing aseptic precautions such as the use of sterile forceps) and the sample is rapidly filtered by the application of suction or pressure. The membrane may then, if required, be transferred to a Petri dish containing nutrient, and incubated.

NOTE: Oxoid filter membranes, metal culture dishes, nutrient pads and prepared media are obtainable from Oxoid Ltd., Southwark Bridge Road, London, S.E.1.

CONSTRUCTION OF FILTER HOLDERS

These are designed for ease and speed of operation. They have a quick sealing ring which engages with the base by a two-start thread. The membrane is clamped between the top part and base, in which rests a fritted glass filter bed using silicone rubber gaskets to effect a seal. Sintered bronze filter beds are also available. The resilience of the gaskets prevents damage to the membrane, and they may be sterilised repeatedly by autoclaving at 121°C (15 lb-in²). The cylindrical funnel top is of stainless steel, the conical top of anodised aluminium, the positive pressure top and all other metal parts being heavily tin nickel plated.

FD-350

FILTER HOLDER, *Gallenkamp,* **with cylindrical funnel top** having capacity marks at 50 and 100 ml.
Dozen **£66. 0. 0.** Each **£6. 0. 0.** *b*

REPLACEMENT PARTS AND ACCESSORIES

FD-351	**Funnel top, stainless steel... ...**	Each	**£0. 12. 0.**	*b*
FD-352	**Gaskets, silicone rubber ... ...**	Pair	**£0. 7. 9.**	*b*
FD-354	**Filter bed, bronze, sintered ...**	Each	**£0. 7. 6.**	*b*
FD-355	**Filter bed, fritted glass ... ...**	Each	**£0. 7. 6.**	*b*

FD-356

FILTER HOLDER, *Gallenkamp,* **with conical funnel top,** 11·5 cm dia. × 18 cm high, capacity 500 ml. The funnel is retained by a split collar which may be re-used if the funnel is replaced.
Dozen **£106. 10. 0.** Each **£9. 10. 0.** *b*

REPLACEMENT PARTS

FD-357	**Funnel top, without collar, anodised aluminium.**	Each	**£1. 15. 0.**	*b*

Other parts see FD-352, FD-354 and FD-355.

FD-358

FILTER HOLDER, *Gallenkamp,* **with positive pressure top,** capacity 100 ml fitted with a nozzle for pressure connection and a screw-on cap for filling and pressure release. Dozen **£90. 0. 0.** Each **£8. 5. 0.** *b*

REPLACEMENT PARTS

See FD-352, FD-354 and FD-355.

CONVERSION PARTS

FD-359	**Top vessel, nickel-plated, converts** FD-350 or FD-356 to FD-358	Each	**£3. 2. 6.**	*b*
FD-361	**Funnel, 11·5 × 18 cm fitted with clamping ring, converts** FD-350 or FD-358 to FD-356 ...	Each	**£6. 10. 0.**	*b*

All items on this page normally available from stock.

Gallenkamp FILTER HOLDERS

FOR BACTERIOLOGICAL FILTRATION USING FILTER MEMBRANES

METAL FILTER HOLDER

Some membrane filters require a fairly high positive pressure particularly when the pore size is very small as for the study of viruses. The Elford filter holder is designed for this application and is very heavily constructed in nickel plated brass and is equally suitable for filtration by suction. The filter holder accommodates a 4 cm membrane which is clamped between two silicone washers and supported by a perforated silver disk. The filter holder is in two parts held together by a screwed clamping ring for which a pair of 'C' spanners is available.

FD-370

FILTER HOLDER, Elford, *Gallenkamp*, for 4 cm membrane, **without spanners** ... Each **£11.15. 0.** *b*

ACCESSORIES

FD-372	**Spanners,** a minimum of 1 pair required.	Pair	**£1. 9. 6.**	*b*
FD-374	**Silicone rubber washers**	Dozen	**£1. 13. 0.**	*b*

ALL-GLASS FILTER HOLDER

Membrane filters provide a means of fast, efficient filtering and this borosilicate glass holder, which accepts standard 47 or 50 mm diameter membranes, is particularly useful in bacteriology since glass is easily cleaned and sterilised.

The selected membrane is supported on a flat ground sintered glass disc of porosity grade 2. For security and freedom from leakage, the membrane is clamped around its periphery by means of a three screw ring clamp. The clamp is so designed that the two halves of the holder are easily assembled and separated.

Gravity filtration

For filtration under gravity or with reduced pressure (using a Buchner flask) the filter holder is supplied with a funnel top of capacity approximately 300 ml, diameter 8·5 cm, overall height from flange to top 11 cm.

Positive pressure filtration

For totally enclosed positive pressure filtration at pressures up to 0·5 atmospheres the filter holder is supplied with a heavy wall glass pressure 'bell' with a capacity of approximately 300 ml. This component is fitted with a pressure connection nozzle and a SQ13 screw joint which accepts the filtrant inlet tube. This tube has a flow control stopcock and nozzle. Both nozzles are for 8 mm bore flexible tubing. Dimensions 8 cm diameter, 28 cm overall height.

Filter body

The filter body is available with either 24/29 or 29/32 standard cone joint, with drip end to deliver below the level of the side tubulure of any Buchner flask with which it may be used. Dimensions 5 cm diameter, 16 cm overall height.

FD-390

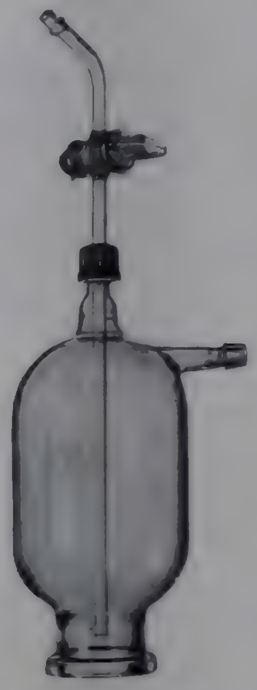
FILTER HOLDER, MEMBRANE, ALL-GLASS, gravity or suction feed, (AG) for 47–50 mm dia. membranes. Comprises funnel top, ring clamp and filter body with fritted glass disk and 24/29 drip ended standard ground cone ... ... Each **£9. 10. 0.** *b*

FD-392

FILTER HOLDER, as FD-390 but with 29/32 cone. Each **£9. 10. 0.** *b*

FD-370

FD-390



FD-402

FD-394

FILTER HOLDER, MEMBRANE, ALL-GLASS, pressure feed, (AG) for 47–50 mm dia. membranes. Comprises pressure top, ring clamp and filter body with fritted glass disk and 24/29 drip ended standard ground cone. Each **£12. 10. 0.** *b*

FD-396

FILTER HOLDER, as FD-394 but with 29/32 cone. Each **£12. 10. 0.** *b*

REPLACEMENT PARTS

FD-400	**Funnel top,** borosilicate glass ...	Each	**£2. 0. 0.**	*a*
FD-402	**Pressure top,** borosilicate glass with SQ13 screw joint but without inlet tube	Each	**£4. 0. 0.**	*a*
FD-403	**Inlet tube** to fit screw joint of FD-402.	Each	**£1. 0. 0.**	*a*
FD-404	**Filter body** with fritted plate and 24/29 cone joint.	Each	**£5. 0. 0.**	*a*
FD-406	**Filter body** with fritted plate and 29/32 cone joint.	Each	**£5. 0. 0.**	*a*

Q-QC13/7	**Screw cap...**	For details and prices see QUICKFIT APPARATUS.
Q-QR13/6	**Rubber ring**	
Q-QW13/6	**PTFE washer**	

ACCESSORIES

FD-215	**Filter pump**	For details and prices see entries in List No. sequence.
FJ-290	**Filter flasks** with 29/32 socket and sidearm	

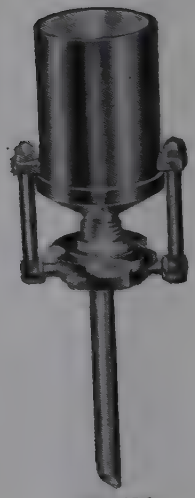
All items on this page normally available from stock.

Gallenkamp FILTER HOLDERS

FOR CLARIFICATION AND STERILISATION

USING CARLSON-FORD FILTER SHEETS

- **Easily sterilised**
- **Rapidly assembled**
- **No washers**
- **Polished stainless steel filter support**



FD-420
FD-425

FD-430

METAL FILTER HOLDERS

Each filter holder is **made of a nickel-silver alloy, heavily silver-plated, and fitted with a perforated stainless steel disk** to support the filter sheet. The disk is polished, including the filtering holes, and is easier to clean and sterilise than a wire gauze. The filter sheet forms the joint between the two halves of the filter and is pulled directly into position under an even pressure, thus ensuring a perfect seal.

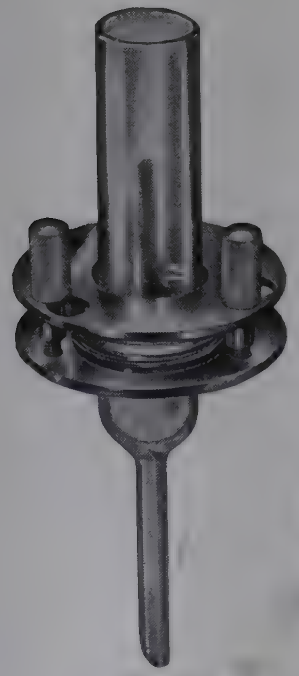
FD-420
FILTER HOLDER, *Gallenkamp*, 40 ml, as specification, for vacuum filtration, to take 3·6 cm dia. filter sheets.
Each **£6. 0. 0.** *b*

FD-425
FILTER HOLDER, *Gallenkamp*, 120 ml, as specification, for vacuum filtration, to take 6 cm dia. filter sheets.
Each **£8. 10. 0.** *b*

FD-430
FILTER HOLDER, *Gallenkamp*, 120 ml, as specification, for vacuum or pressure filtration, to take 6 cm dia. filter sheets ... ... Each **£10. 10. 0.** *b*

GLASS FILTER HOLDERS

These filter holders are **made of glass with stainless steel disks.** Each is designed so that filtering liquids come in contact only with glass and a stainless steel perforated disk which supports the filter sheet. This eliminates contamination by toxic metals, which may occur with worn plated-metal filter holders. The disk, including the filtering holes, is polished to withstand corrosion, and fits in a recess in the lower part of the glass filter. The glass parts are held together by screws with milled heads, using finger-tightening to prevent breakage of the glass flanges.



FD-440
FD-450

FD-440
FILTER HOLDER, *Gallenkamp*, as specification, to take 3·6 cm dia. sheets ... ... Each **£3. 16. 0.** *b*

REPLACEMENT PARTS

FD-442	Glass lower part	Each	£0. 13. 6.	*a*
FD-444	Glass upper part	Each	£0. 9. 9.	*a*

FD-450
FILTER HOLDER, *Gallenkamp*, as specification, to take 6 cm dia. sheets ... ... Each **£5. 8. 6.** *b*

REPLACEMENT PARTS

FD-452	Glass lower part	Each	£1. 5. 0.	*a*
FD-454	Glass upper part	Each	£0. 19. 0.	*a*

Filter sheets, *Carlson-Ford*, for use with *Gallenkamp* filters FD-420 to FD-450, see FC-030 to FC-052 in List No. sequence.

All items on this page normally available from stock.

FILTER HOLDERS

FOR CLARIFICATION AND STERILISATION

METAL FILTER HOLDER

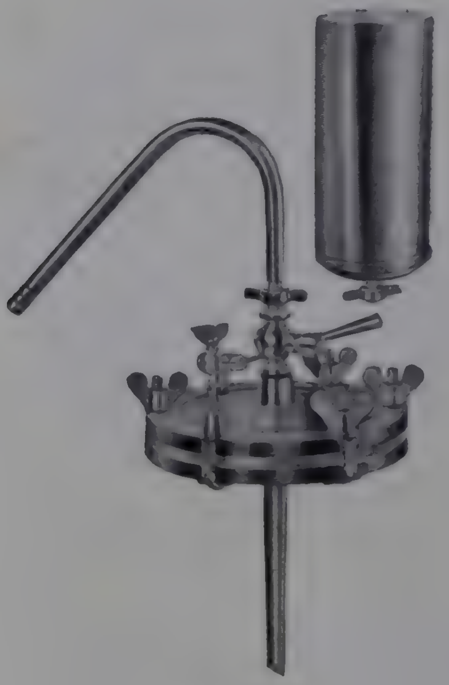
FD-465

FILTER HOLDER, for 14 cm filter sheets with centre connection to take either an inlet pipe, or funnel of about 750 ml capacity, for positive or negative pressure filtration. This filter, which is of gunmetal, heavily silver-plated, is fitted with a stainless steel perforated disk to support the filter sheet. Experiment has shown that the rate of filtration is faster using a disk than a wire gauze support, which is not so easy to clean and sterilise. Complete with inlet pipe and 750 ml funnel ... ... Each **£23. 10. 0.** *m*

ACCESSORIES

FD-050 **Pressure Vessel,** for use with FD-465. Details and price see entry in List No. sequence.

Filter sheets, *Carlson-Ford,* for use with filter FD-465, see FC-070 in List No. sequence.



FD-465

HEMMINGS FILTER HOLDER

These filter holders are for clarification and sterilisation of small samples of biological fluids, when rapid filtration without heavy loss of material is required. The filter holders, which are made of chromium plated brass, are normally used in pairs in a centrifuge with 50 ml buckets. Each filter holder is fitted with two 7 ml screw cap bottles CX-200, one to contain the original sample and the other to act as the receiver. The liquid is filtered by 18 mm dia. filter sheets, and the product can be stored in the receiver bottle, thus minimising the risk of contamination. The filter holders are easily cleaned and assembled. Tests have shown that 4 ml of nutrient broth can be sterilised in each filter holder in 5 minutes, using a grade EKS sheet, and a Junior centrifuge CF-405, with head CF-430, rotating at 2300 rev/min.

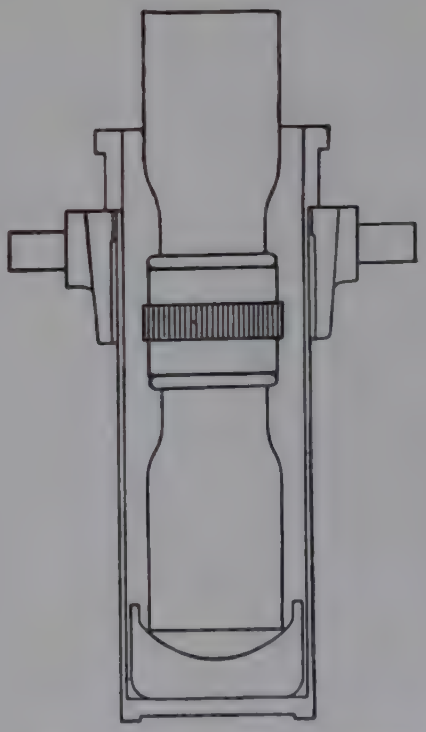
FD-480

FILTER HOLDER, Hemmings, as specification, **but without bottles or filter sheets.** Pair **£2. 2. 0.** *f*

ACCESSORIES

FD-482	**Filter sheets,** *Carlson-Ford,* grade EKS, 18 mm dia. Pkt. of 200 **£0. 18. 0.** *m*	
CF-405	**Junior centrifuge** ...	For details and prices see entries in List No. sequence.
CF-430	**Head**	
CX-200	**Screw cap bottles.** For details and prices see entry in List No. sequence.	

NOTE: Filters fitted with 14 ml bottles require 100 ml size centrifuge buckets as used on centrifuge CF-600 with head CF-645.



Filter assembled with 7 ml bottles CX-200 in bucket of centrifuge CF-405, with head CF-430.

FD-480

All items on this page normally available from stock.

FRITTED GLASS FILTERS

See **FRITTED FILTRATION APPARATUS** on page 297 for details of porosities of fritted glassware and their application, with notes on their cleaning and care.

IMPORTANT NOTICE WHEN ORDERING FRITTED FILTERS

All AG fritted filters are identified by reference numbers. The first part of the reference number represents the pattern and size number of the particular article. Thus:—

15X is a filter tube FD-560 with fritted plate 20 mm dia.
12X is a filter FD-630 with fritted plate 10 mm dia.

The final figure of the reference number represents the porosity of the fritted plate. Thus:—

6X1 is a filter tube FD-560 with fritted plate 30 mm dia. of porosity 1.

NOTE: All diameters specified for fritted filter plates are nominal and may vary up to 5%. Shrinkage during firing increases with decreasing pore size so that in general a fine porosity plate will have a smaller diameter than a coarse one of the same nominal size.

Always use full reference number, including final porosity figure, when ordering.

POROSITIES AVAILABLE AND APPLICATIONS

Porosity grade	Range of maximum pore dia. µm	Principal uses
0	200—250	Coarse distribution of gas in liquids.
1	100—120	Filtration of very coarse precipitates. Support for absorptive layers for filtering gelatinous precipitates. Gas distributors in liquids. Extraction of coarse grain material.
2	40— 50	Preparative work with crystalline precipitates.
3	20— 30	Preparative work with fine precipitates. Analytical work with medium precipitates. Fine gas filters. Mercury filters. Extraction of fine grain material.
4	5— 10	Analytical work with very fine precipitates ($BaSO_4$, Cu_2O). Preparative work with finest precipitates. Safety valves for mercury.
5	1—1·8	Bacteriological filtration.

IN ADDITION TO APPARATUS SHOWN ON THE FOLLOWING PAGES, OTHER APPARATUS WITH

AG FRITTED GLASS PLATES

WILL BE FOUND UNDER THE HEADINGS AS SHOWN BELOW

For details and prices see entries in List No. sequence.

CHROMATOGRAPHY

CK-850	**Spot collector funnel.**
CL-100 **CL-130**	**Chromatograhy columns.**

FILTER CRUCIBLES

CW-480	**Filter crucibles,** Gooch, improved pattern.
CW-520	**Filter crucibles,** Gooch, with ground glass joint.

EXTRACTION APPARATUS

EV-400	**Extraction thimbles,** made entirely of fritted glass.
EV-420	**Extraction thimbles,** for use in place of paper thimbles in Soxhlet apparatus.

FILTER FUNNELS

FD-390	**Membrane filter holder.**
FP-400	**Funnels, cylindrical**
FP-402	**Funnels, Buchner**
FP-410 **FP-416** **FP-420** **FP-426**	**Funnels,** as FP-400 and FP-402, but with 24/29 cone on stem.
FP-414 **FP-424**	**Funnels,** as FP-402, but with 29/32 cone on stem.
FP-440	**Funnels, Hirsch.**
FP-445	**Funnels, Hirsch,** with 19/26 cone, for semi-micro work.

GAS ABSORPTION AND DISTRIBUTION

AB-800	**Gas absorption bottle.**
GC-176	**Gas analysis absorption vessel, Shepherd.**
GD-950 **GD-955**	**Gas filter tubes.** Also for use as a safety valve for mercury.
GD-820	**Gas distribution tubes,** new improved pattern, with dome shaped fritted plate.
GD-830	**Gas distribution tubes.**
GD-840	**Gas distribution tubes,** thimble form.
GF-540	**Gas washbottles, Drechsel,** with new design gas distributor.
GF-560	**Gas washbottles, Drechsel.**
GF-580	**Gas washbottle,** with excellent absorption at very high flow rate.
MK-190	**Micro gas generator.**

MERCURY CLEANING

MF-890	**Mercury cleaning apparatus.**

AG FRITTED GLASS FILTERS

Regd.

FD-520

FILTER PLATES, AG fritted borosilicate glass, flat. Porosity 0, 1, 2, 3 or 4. Please state porosity required.

Nominal dia.	10	15	20	30	40 mm	
Dozen	**42/–**	**46/–**	**46/–**	**48/–**	**62/–**	a
Each	**4/11**	**5/2**	**5/2**	**5/4**	**6/4**	

Nominal dia.	65	90	120	175 mm	
Dozen	**135/–**	**245/–**	**440/–**	**620/–**	a
Each	**12/3**	**22/6**	**40/–**	**56/–**	

FD-525

FILTER PLATES, AG fritted borosilicate glass, flat, with fused rim to prevent edge leakage when clamped between rubber rings. Porosity 0, 1, 2, 3 or 4. Please state porosity required.

Nominal dia.	40	65	90	120	175 mm	
Dozen	**96/–**	**180/–**	**300/–**	**560/–**	**740/–**	a
Each	**9/–**	**16/6**	**27/–**	**51/–**	**66/–**	

FD-530

FILTER PLATES, AG fritted borosilicate glass, flat, for botanical work. Used as a convenient substratum to grow seeds, excised embryos, fragments of tissue, germinating fern spores, etc., under aseptic conditions. For this purpose, the precise accuracy of porosity is immaterial and thus the comprehensive testing applied to our graded plates FD-520 is avoided. Average size of pores 100–300 μm.

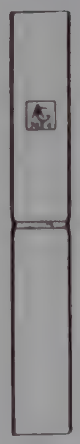
Nominal dia.	40	65	90	120 mm	
Dozen	**40/–**	**74/–**	**118/–**	**175/–**	a
Each	**4/9**	**7/4**	**10/9**	**16/–**	

References

Proceedings of the Royal Society, Series B, Volume 136, Nos. 882 and 885.

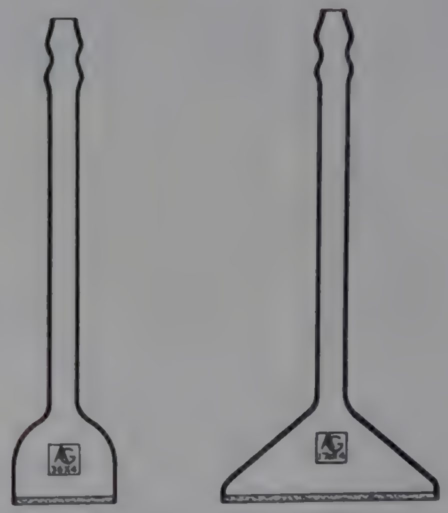
Annals of Botany, 1946, Studies in germination and seedling growth.

FD-520
FD-525
FD-530



73X
74X
75X
76X

FD-540



36X

17cX
25cX

FD-550

FD-540

FILTER TUBES, AG borosilicate glass, consisting of a fritted plate sealed into the centre of a tube 150 mm long. Designed for making up into special apparatus without the troublesome job of sealing-in the plate itself, an operation requiring special equipment and skill. Will seal interchangeably to *Davisil, Firmasil* or *Pyrex brand* glass.

Ref. Nos.	73X0 73X1 73X2 73X3 73X4	74X0 74X1 74X2 74X3 74X4	75X0 75X1 75X2 75X3 75X4	76X0 76X1 76X2 76X3 76X4	
Dia. of plate	10	20	30	40 mm	
Dozen	**78/–**	**84/–**	**96/–**	**125/–**	a
Each	**7/8**	**8/–**	**9/–**	**11/3**	

FD-550

FILTERS, IMMERSION, AG borosilicate glass, with fritted plate, for use by immersion in the liquid to be filtered after allowing the precipitate to settle.

Ref. Nos.	36X2 36X3	17cX2 17cX3	25cX2 25cX3	
Dia. of plate	30	65	90 mm	
Height above plate	110	110	125 mm	
Dozen	**170/–**	**280/–**	**520/–**	a
Each	**15/6**	**25/6**	**47/–**	

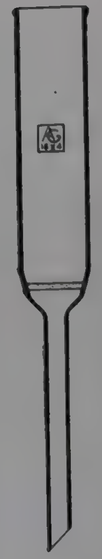
When ordering please specify AG fritted filters and state Reference No.

FILTERS, immersion, thimble form, see gas distribution tubes GD-840, GD-845 in List No. sequence.

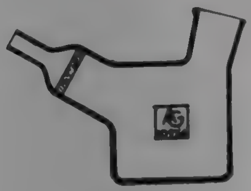
All items on this page normally available from stock.

AG FRITTED GLASS FILTERS

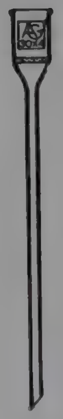
Regd.



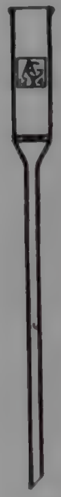
15X
6X
FD-560



109X
FD-620

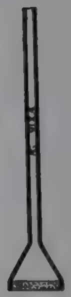


30X

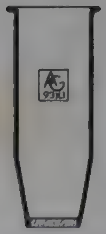


12X

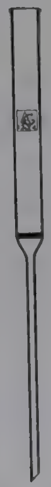
FD-630



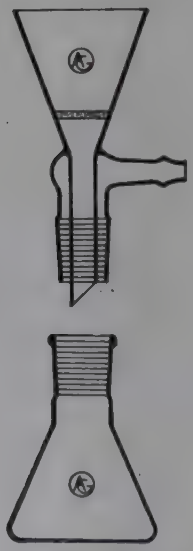
91X
FD-640



93X
FD-650



12aX
FD-660



FD-670
with
FD-672

When ordering please specify AG fritted filters and state Reference No.

FD-560

FILTER TUBES, AG borosilicate glass, with fritted plate. Type 6X2 can be used as a mercury filter for mercury passing through under its own weight.

Ref. Nos.	15X3 15X4	6X1 6X2 6X3 6X4	
Dia. of plate	20	30 mm	
Height above plate	100	200 mm	
Capacity about	30	120 ml	
Dozen	**108/-**	**118/-**	a
Each	**10/-**	**10/9**	

MICRO FILTERS

FD-620

FILTER BEAKER, AG with fritted filter plate, 10 mm dia. sealed into side spout. Capacity about 6 ml. Ref. No. 109X4. Dozen **£12. 15. 0.** Each **£1. 3. 6.** a

FD-630

FILTER FUNNELS, AG with fritted filter plate, to BS 1428, part F1.

Ref. Nos.	30X3 30X4	12X1 12X3 12X4	
Dia. of plate	10	10 mm	
Height above plate	15	40 mm	
Capacity about	1	3 ml	
Dozen	**96/-**	**96/-**	a
Each	**9/-**	**9/-**	

FD-640

FILTER STICK, (Immersion filter), AG Pregl pattern, with fritted filter plate 10 mm dia., to BS 1428, part F1. Overall length 60 mm. Ref. No. 91X4. Dozen **£7. 5. 0.** Each **£0. 13. 3.** a

FD-650

FILTER TUBE, centrifuge, AG with fritted filter plate 10 mm dia. Capacity about 3 ml, height 45 mm to fit inside 15 ml centrifuge tube. Ref. No. 93X3. Dozen **£5. 0. 0.** Each **£0. 9. 3.** a

FD-660

FILTER TUBES, AG with fritted filter plate.

Ref. Nos.	12aX3 12aX4	
Dia. of plate	10 mm	
Height above plate	100 mm	
Capacity about	6 ml	
Dozen	**100/-**	a
Each	**9/3**	

FD-670

FILTER FUNNEL, micro-Hirsch, AG with fritted filter plate 10 mm dia., funnel top 35 mm dia., 14/15 cone and vacuum connection. Ref. No. 38X3. For use with flasks FD-672. Dozen **£11. 15. 0.** Each **£1. 1. 6.** a

ACCESSORY

FD-672 **Flasks, conical, with 14/15 socket for above funnels.**

Capacity	5	10	25 ml	
Dozen	**70/-**	**74/-**	**80/-**	a
Each	**7/-**	**7/4**	**7/10**	

All items on this page normally available from stock.

POROUS STAINLESS STEEL FILTERS

INTRODUCTION

Porous stainless steel filters, with maximum carbon content 0·19% have been developed to cover many laboratory filtering requirements. They comprise a number of interchangeable parts, which can be assembled to make four filters. Each filter incorporates a porous stainless steel disk, which fits into a 'U' section washer of silicone rubber to prevent leakage. Several disks, 3 mm thick, of different pore size are available. Neoprene washers are alternatively available if specified.

CLEANING

The porous filters, after removal of the washers, can be cleaned by boiling in 20% caustic soda solution or 15% nitric acid solution. The sealing washers should be cleaned in water.

POROSITIES AVAILABLE AND APPLICATIONS

The disks are available in porosity grades 1 to 4. The average pore size (μm) and principle uses of the grades are similar to those of fritted glass, details of which will be found under FILTERS, FRITTED GLASS on page 276.

FD-700
FILTER, IMMERSION, as specification, with disk dia. 6·5 cm, for use with beakers. Complete with funnel, silicone rubber washer, and two screwed rings for clamping, and disk **porosity 1** unless otherwise specified when ordering ... ... Each **£6. 5. 0.** *m*

FD-702
FILTER, IMMERSION, as FD-700, but with disk dia. 10·3 cm ... ... Each **£10. 10. 0.** *m*

FD-704
FILTER FUNNEL, Buchner, as specification, with disk dia. 6·5 cm. Complete with funnel, Buchner top, silicone rubber washer and two screwed rings for clamping, and disk **porosity 1** unless otherwise specified when ordering ... ... Each **£7. 10. 0.** *m*

FD-706
FILTER FUNNEL, Buchner, as FD-704, but with disk dia. 10·3 cm ... ... Each **£13. 10. 0.** *m*

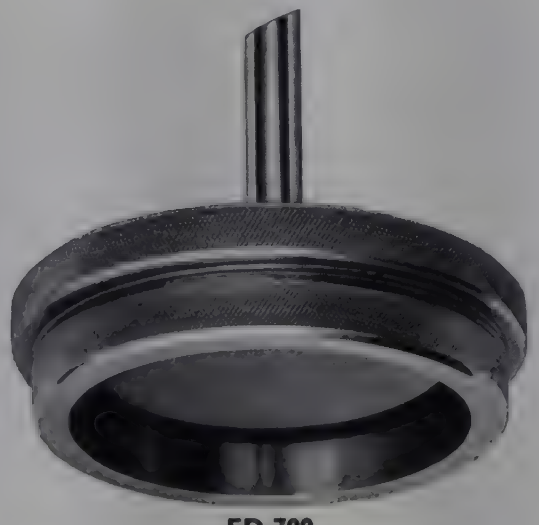
FD-708
FILTER, PIPELINE, as specification, with disk dia. 6·5 cm. Complete with inlet and outlet funnels, silicone rubber washer, and two screwed rings for clamping, and disk **porosity 1** unless otherwise specified when ordering. Each **£8. 10. 0.** *m*

FD-710
FILTER, PIPELINE, as FD-708, but with disk dia. 10·3 cm ... ... Each **£13. 10. 0.** *m*

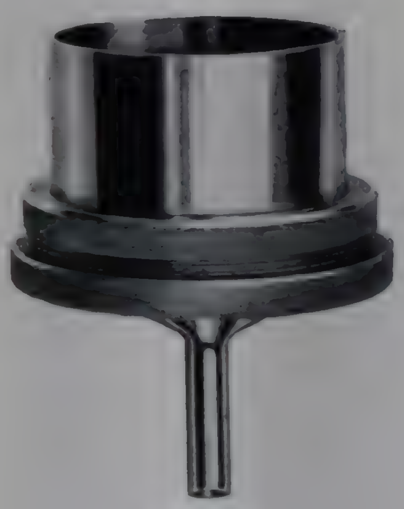
FD-712
AERATOR, as specification, with disk dia. 6·5 cm. Complete with aerator bottom, silicone rubber washer, and two screwed rings for clamping, and disk **porosity 1** unless otherwise specified when ordering. Each **£7. 10. 0.** *m*

FD-714
AERATOR, as FD-712, but with disk dia. 10·3 cm. Each **£11. 15. 0.** *m*

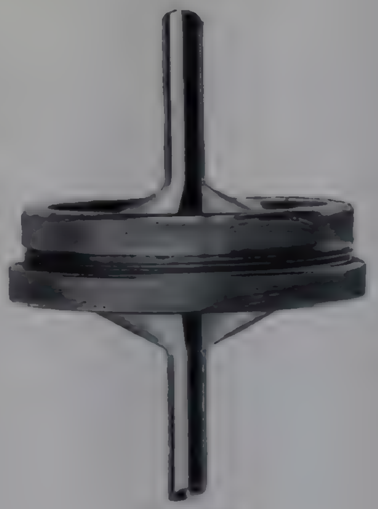
When ordering please state porosity required.



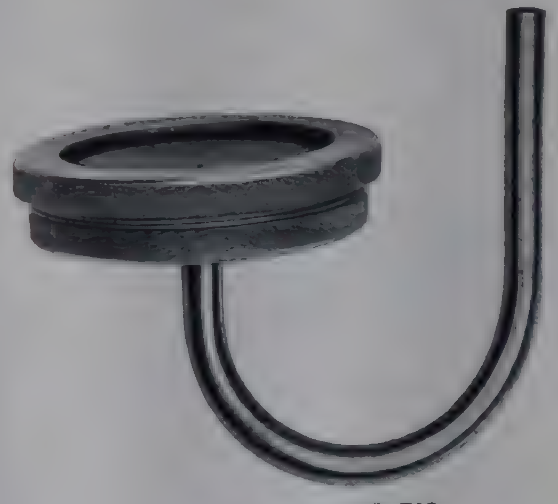
FD-700
FD-702



FD-704
FD-706



FD-708
FD-710



FD-712
FD-714

REPLACEMENT PARTS

For filters 6·5 cm dia.

FD-719	Screwed rings	Pair	£2. 18. 0.	*m*
FD-722	Funnel	Each	£2. 4. 0.	*m*
FD-723	Buchner top	Each	£1. 6. 0.	*m*
FD-724	Aerator bottom	Each	£3. 10. 0.	*m*
FD-725	Filter disk. Please state porosity 1, 2, 3 or 4 when ordering	Each	£0. 17. 6.	*m*
FD-726	Washer, silicone rubber... ...	Each	£0. 6. 0.	*m*

For filters 10·3 cm dia.

FD-729	Screwed rings	Pair	£5. 17. 0.	*m*
FD-732	Funnel	Each	£2. 18. 0.	*m*
FD-733	Buchner top	Each	£3. 2. 0.	*m*
FD-734	Aerator bottom	Each	£4. 8. 0.	*m*
FD-735	Filter disk. Please state porosity 1, 2, 3 or 4 when ordering	Each	£1. 9. 6.	*m*
FD-736	Washer, silicone rubber ...	Each	£0. 6. 6.	*m*

All items on this page normally available from stock.

FD-810

FD-835 with receiver

FD-810

FILTER, Witt, with ground-on cover and ground-in funnel. Size of jar 16 cm high, 11 cm dia., dia. of funnel 10 cm ... ... Dozen **£37. 12. 6.** Each **£3. 9. 0.** *d*

FD-835

FILTER, Buchner type, polythene, for vacuum filtration. Made in two pieces for ease of cleaning. With perforated plate to support 11 cm dia. filter paper, suction nozzle for 6·5 mm bore flexible vacuum tubing mounted below perforated plate and rubber sealing gasket to support the filter on receivers with internal neck diameters from 26 to 65 mm. The funnel top is a push-fit into the lower section and has a capacity of approximately 750 ml ... ... Each **£2. 5. 0.** *m*

ACCESSORIES

FD-215	**Filter pump**	For details and prices see entries in List No. sequence.
FD-260	**Air inlet valve**	
TX-525	**Vacuum tubing H6·5** ...	

For suitable 11 cm dia. filter papers for Buchner funnels see pages 264/265.

FD-850

***FD-850**

FILTER, centrifugal. Comprising a 250W electric motor with perforated aluminium basket type head 15 cm dia. × 5 cm high rotating in transparent plastics bowl with lid. The basket is fitted with a nylon gauze strainer for coarse filtration or crystal drying. For finer filtration, filter paper strip 5 cm wide (e.g. CK-515 &c.) can be used. The bowl has a drain spout and an entry port is fitted in the lid so that continuous filtration can be carried out. For 220-250V a.c. supplies only. Overall dimensions 18 cm dia. 28 cm high. Weight 4 kg.
Each **£12. 15. 10.** *m*

FD-860

FD-890

FD-860

FILTER, pressure, for water filtration, to be permanently fixed to water supply. Made in cast-iron, white enamelled inside and out, with nickel-plated fittings. Using a new filter, water at 2·8 kg/cm² (40 lb/in²) pressure will give an output of approximately 115 litres/hour (25 gal) per hour. Complete with wall bracket and instructions for fixing and cleaning ... Each **£6. 10. 0.** *m*

FD-862 **Spare cylinder,** 25 × 5 in. ... Each **£0. 13. 9.** *m*

FD-890

FILTER, demountable, polythene, for filtering radioactive liquids. It may be easily assembled and dismantled inside a dry box and will fit into a flask with a 24/29 socket. To take 22 mm dia. filter paper ... Each **£4. 10. 0.** *f*

All items on this page normally available from stock.

FIRE EXTINGUISHERS

FF-300

EXTINGUISHER, non-toxic bromochlorodifluoromethane (BCF). A highly effective agent for small oil, solvent and electric fires. In handy aerosol container with mounting bracket.
Carton of 12 **£15. 0. 0.** Each **£1. 7. 6.** *mS*

FF-320

EXTINGUISHER, carbon tetrachloride, one quart, for oil, solvent and electric fires. Double action pump provides continuous jet. With wall bracket and initial charge. Brass finish... ... ... Each **£5. 0. 0.** *mS*

FF-322 **Refill,** for FF-320 ... Each **£0.11. 6.** *fS*

FF-340

EXTINGUISHER, soda acid, 2 gallon, for oil and solvent fires. With wall hook and initial charge. Finished red ... ... Each **£7. 0. 0.** *m*

FF-342 **Refill,** for FF-340, comprising powder and acid. Each **£0. 8. 6.** *f*

FF-360

EXTINGUISHER, foam, 2 gallon, for oil and spirit fires. With wall hook and initial charge. Finished cream. Each **£8. 0. 0.** *m*

FF-362 **Refill,** for FF-360, comprising 2 tins of powder. Each **£0.10. 6.** *f*

FF-380

EXTINGUISHER, foam, 1 gallon, as FF-360. Each **£7.15. 0.** *m*

FF-382 **Refill,** for FF-380, comprising 2 tins of powder. Each **£0. 9. 6.** *f*

FF-400

EXTINGUISHER, carbon dioxide, 2½ lb, with squeeze grip control valve, for all types of bench fires. With initial charge ... ... Each **£11.10. 0.** *mS*

FF-402 **Refill,** for FF-400. The extinguisher must be returned for refilling ... Each **£0.17. 6.** *m*

FF-440

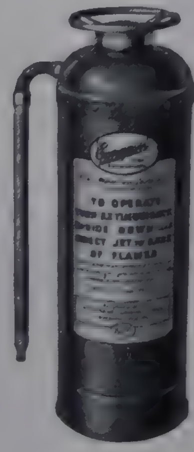
ASBESTOS BLANKET, 150 × 150 cm (5 × 5 ft), in metal container ... ... Each **£5. 0. 0.** *mS*

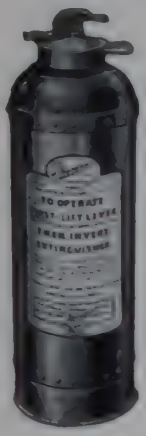
FF-460

FIRE BUCKET, rigid polythene, D shape, coloured red with FIRE blocked in black. Dimensions approx. 28 × 28 × 25 cm, capacity 9 litres ... Each **£0.13. 4.** *mS*

FF-300

FF-320


FF-340


FF-360
FF-380

FF-400

FF-460

FIRST AID

FF-820

FIRST AID CABINET, 32 cm wide × 10 cm high × 22 cm deep. Grey mottled enamelled case with lugs for wall fixing. Contains dressings and sundries to comply with Home Office Factory Regulations with extras, bottle TCP, tube Acriflavine cream; scissors; tweezers; eye bath; 6·3 × 90 cm dressing strip; and 15 cm kidney tray. Suitable for up to 50 people ... ... Each **£3.16. 8.** *mS*

FF-840

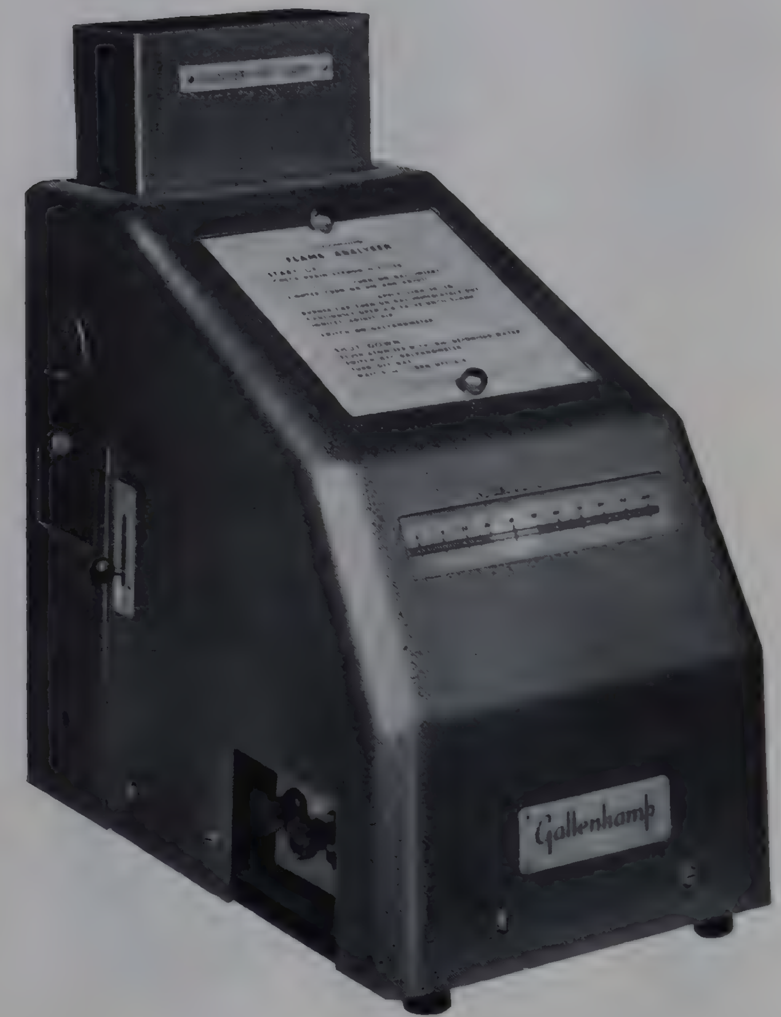
FIRST AID CABINET, 32 cm wide × 17 cm high × 22 cm deep. Grey mottled enamelled case with lugs for wall fixing. Contains dressings and sundries to comply with Home Office Factory Regulations with extras, bottle TCP; tube Acriflavine cream; scissors; tweezers; eye bath; 6·3 × 90 cm dressing strip; and 15 cm kidney tray. Suitable for 50 to 150 people ... Each **£6.13. 2.** *mS*

FF-840

Items on this page coded S normally available from stock.

Gallenkamp FLAME ANALYSER

(FLAME PHOTOMETER)


FH-500

For rapid, accurate sodium and potassium determinations in:

Biochemical samples, pharmaceuticals, cosmetics, foods
Plant and animal tissues
Fertilisers, soils, water, oils
Cement, glass, ceramics and many other materials

[An interference filter for **calcium determination** is described under FH-545.]

PERFORMANCE AND OPERATION

Technical data

Sodium 2 ppm (0·087 mE/l) full scale at maximum sensitivity.
Potassium 5 ppm (0·125 mE/l) full scale at maximum sensitivity.
Sample uptake rate: 4 ml/min.
Minimum volume for one reading: 0·5 ml. (For accurate results, the average of several readings should be taken).
Repeatability: 1%.
Cross interference from 100-fold excess of cation: normally $< 5\%$.

- **High maximum sensitivity—5 ppm K and 2 ppm Na full scale**
- **Insignificant cross-interference even with high concentrations**
- **Immediate operation—no warming up, negligible drift**
- **Accurate readings in 5 seconds with 0·5 ml sample**
- **Suitable for town gas, bottled gas or petrol-air gas**
- **Easy and complete accessibility of all component parts**
- **Robust galvanometer with easily adjustable optical elements**
- **Flick changeover filter turret—recessed simple controls**
- **All parts corrosion resistant—camera blackened interior**

Principle of operation

A dilute aqueous solution of the material under examination is sprayed through an atomiser into a non-luminous air/gas flame. Light from this flame is collected by a simple optical system and passes through a selective filter onto a photocell coupled to a galvanometer. The deflection of the galvanometer is proportional to the concentration of the solution being sprayed. The instrument is calibrated bv the user by spraying standard solutions.

Referring to the functional diagram of the apparatus, the sample is drawn up from the beaker through a stainless steel tube (1) and is atomised in a special, high efficiency, atomiser by compressed air introduced through a tube (2).

A needle valve and pressure indicator are inserted to control the air flow. The spray from the atomiser is mixed with gas (tube 3) controlled by another valve, in a chamber where large droplets are removed by baffles. Only aerosols pass into the burner head (4) and thence to a flat flame which produces a uniformly illuminated field. A special non-conductive section (5) in the burner tube ensures that the temperature of the mixing chamber rapidly stabilises.

Surplus liquid is drawn off by a siphon drain (6) which may be extended by tubing to a sink.

Light from the flame (7) condensed by a lens (8) and an aluminised mirror (9) passes through a filter (10) to a photocell (11). Two filters for sodium, potassium or calcium are mounted in a quadrant-shaped holder (12) which can be positioned as required by a finger-tip lever. The photocell, a selenium barrier-layer type, is 'potted' for protection against atmospheric poisoning.

Gallenkamp FLAME ANALYSER

(continued)

Cleaning and maintenance

Scrupulous cleanliness, particularly of the atomiser and burner, is the secret of success with the flame analyser. The whole burner assembly, placed behind a removable side cover, is detached for cleaning by loosening a single milled nut.

Services required

Compressed air (clean, oil-free) 1·0 kg/cm² (15 lb/in²) maximum.
Gas supply—coal gas (4 to 6 in w.g.) or butane, propane, petrol-air gas (4 to 10 in w.g.)
Electricity—100/120 and 200/250V a.c.

CONSTRUCTION AND DIMENSIONS

General construction

All working parts except the galvanometer scale are mounted on a rigid base over which is fitted a fibreglass cover. This construction simplifies cleaning and servicing, since all component parts are accessible when the cover has been removed, without the need to detach control knobs or service connections. The analyser can, in fact, be operated for adjustment purposes, in a darkened room with the cover removed, using a temporary galvanometer scale. The instrument is well ventilated; the draught induced by the burner not only cools the filters and photocell but also clears the interior of any temporary interfering agents such as smoke or dust particles.

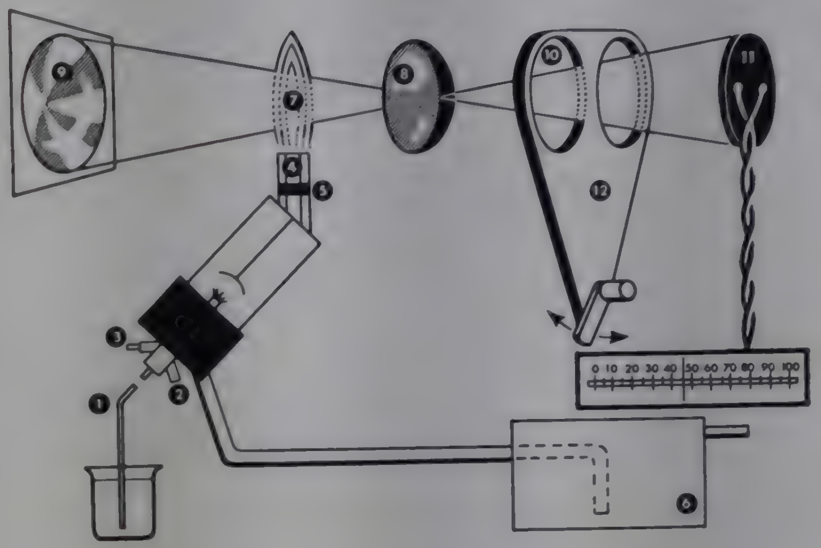
Galvanometer

The photocell output is measured by a built-in, taut suspension, reflecting galvanometer. An accessible lever permits zero setting. A rotary resistor controls the sensitivity, the circuit being designed so that the rate of response of the galvanometer is never more than 5 seconds for a full scale deflection. Readings are taken from a 15 cm scale mounted at a convenient angle. The galvanometer lamp is fed from a built-in transformer. The lamp switch short circuits the galvanometer for protection when not in use.

Operating controls

Gas and compressed air for the burner are controlled by recessed needle valves. A pressure gauge, mounted inside the casing and exposed by lifting an inspection cover, is used for initial lighting and setting of the flame. A governor is fitted in the gas supply line and a lighting port is provided in the side of the case.

The lay-out is expressly designed to leave only the galvanometer scale facing the operator and so avoid distraction. Even so, when required to be adjusted, all controls are conveniently situated and adjustments are simple to make. There is no 'warming-up' period—readings can be taken as soon as the flame has been lighted.



Dimensions and weight

Overall height	40 cm (16 in)
Width	20 cm (8 in)
Depth	38 cm (15 in)
Weight	8 kg (17½ lb)

ACCESSORIES

The recommended air compressor delivers clean air and will be found very satisfactory in service. A small pack of polystyrene beakers is supplied with each instrument. These are low in price and are considered to be expendable items which will save washing up time. Glass beakers are available, if preferred, at extra cost.

Standard solutions and distilled water must be stored in plastics bottles (glass is NOT suitable); a suitable range is listed under BOTTLES and List No. BT-205 is especially recommended.

FH-500
FLAME ANALYSER, *Gallenkamp*, as specification, with sodium and potassium filters, plastics dust cover, and one dozen plastics beakers. For 100/120 and 200/250V a.c. single phase supplies. Each **£122. 10. 0.** g

Instruments can be supplied for battery operation. Prices on application.

REPLACEMENT PARTS

FH-510	**Atomiser** … … … …	Each	**£6. 0. 0.**	*b*
FH-516	**Filter,** sodium … … …	Each	**£1. 3. 3.**	*m*
FH-518	**Filter,** potassium … … …	Each	**£1. 3. 3.**	*m*
FH-525	**Photocell** … … … …	Each	**£3. 14. 0.**	*m*
EJ-944	**Lamp,** galvanometer, 4V, 0·5A, M.E.S. For price see entry in List No. sequence.			
FH-540	**Dust cover,** plastics … …	Each	**£1. 0. 6.**	c

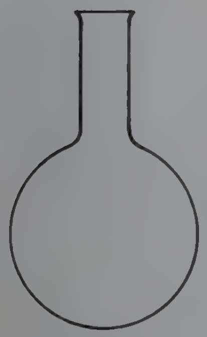
ACCESSORIES

FH-545	**Filter,** calcium. Recommended only where the calcium is isolated from interfering cations, or where compensation for interference may be effected either by arithmetic correction or by doping the standard solution.	Each **£14. 0. 0.** *m*
AF-510	**Air compressor** … …	For details and prices see entries in List No. sequence.
BJ-840	**Beakers,** plastics … …	
BT-205	**Bottles,** plastics … …	

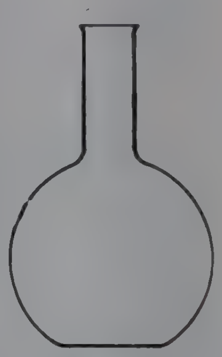
All items on this page normally available from stock.

FLASKS

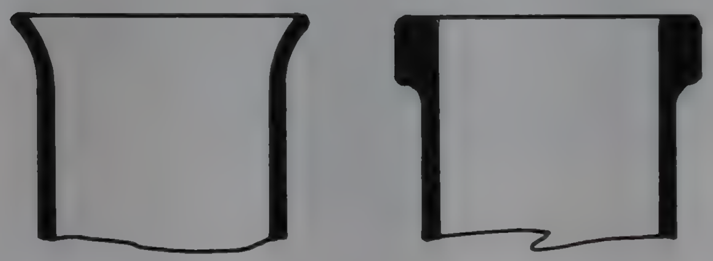
Culture	see CULTURE
Extraction	see EXTRACTION
Quickfit	see QUICKFIT APPARATUS
Standard joint	see QUICKFIT APPARATUS
Sulphonation	see PETROLEUM TESTING
Warburg	see MEDICAL SCIENCES
Vacuum	see VACUUM VESSELS



FJ-010
FJ-016



FJ-030
FJ-036



up to 55 mm dia.
vial neck **V**

over 55 mm dia.
tooled ring **TR**

Neck finishes for *Pyrex brand* **flasks**

ROUND BOTTOM FLASKS

FJ-010

FLASKS, round bottom, *Pyrex brand* glass.

Capacity	25	50	100	150 ml	
Neck finish	V	V	V	V	
Std. pack qty.	12	96	72	96	
Std. pack	**29/–**	**245/–**	**189/–**	**259/–**	*d*
Dozen	—	**33/–**	**34/–**	**35/–**	
Each	**4/–**	**4/3**	**4/3**	**4/4**	

Capacity	250	500	1000	1500 ml	
Neck finish	V	V	V	V	
Std. pack qty.	72	48	36	24	
Std. pack	**232/–**	**205/–**	**224/–**	**219/–**	*d*
Dozen	**41/–**	**54/–**	**78/–**	**112/–**	
Each	**4/10**	**5/10**	**7/6**	**10/3**	

Capacity	2	3	4	5	10	20 litres	
Neck finish	V	V	V	TR	TR	TR	
Std. pack qty.	18	12	6	6	4	1	
Std. pack	**197/–**	**192/–**	**125/–**	**152/–**	**207/–**	—	*d*
Dozen	**135/–**	—	—	—	—	—	
Each	**12/3**	**17/9**	**23/3**	**28/3**	**57/6**	**74/–**	

FJ-016

FLASKS, round bottom, *Davisil* glass, to BS 2734.

Capacity	100	250	500	1000 ml	
Std. pack qty.	24	12	12	12	
Std. pack	**54/–**	**30/9**	**40/3**	**62/9**	*d*
Dozen	**27/6**	—	—	—	
Each	**3/10**	**4/1**	**4/9**	**6/6**	

FLAT BOTTOM FLASKS

FJ-030

FLASKS, flat bottom, *Pyrex brand* glass.

Capacity	50	100	150	250	400 ml	
Neck finish	V	V	V	V	V	
Std. pack qty.	120	144	96	72	72	
Std. pack	**315/–**	**389/–**	**259/–**	**243/–**	**270/–**	*d*
Dozen	**34/–**	**36/–**	**35/–**	**43/–**	**48/–**	
Each	**4/4**	**4/5**	**4/4**	**5/–**	**5/4**	

Capacity	500	1000	1500	2000 ml	
Neck finish	V	V	V	V	
Std. pack qty.	60	36	24	18	
Std. pack	**265/–**	**240/–**	**171/–**	**201/–**	*d*
Dozen	**57/–**	**84/–**	**88/–**	**135/–**	
Each	**6/–**	**8/–**	**8/3**	**12/6**	

Capacity	3	5	10	12	20 litres	
Neck finish	V	TR	TR	TR	TR	
Std. pack qty.	12	6	4	4	1	
Std. pack	**190/–**	**160/–**	**197/–**	**230/–**	—	*d*
Each	**17/6**	**29/6**	**54/9**	**63/9**	**85/3**	

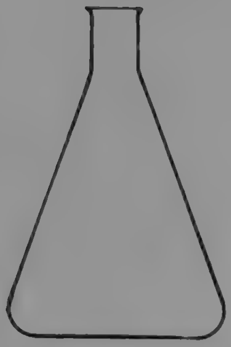
FJ-036

FLASKS, flat bottom, *Davisil* glass, to BS 2734.

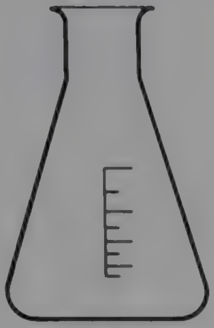
Capacity	100	250	500	1000 ml	
Std. pack qty.	24	12	12	12	
Std. pack	**50/–**	**30/9**	**40/3**	**62/9**	*d*
Dozen	**25/3**	—	—	—	
Each	**3/8**	**4/1**	**4/9**	**6/6**	

QUANTITY DISCOUNTS for glassware in bulk quantities see 'Conditions of Sale'.

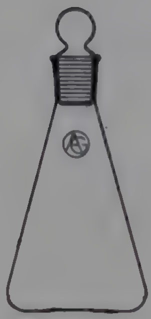
All items on this page normally available from stock.



FJ-050
FJ-052
FJ-056



FJ-051



FJ-058
with
SU-520

NARROW MOUTH CONICAL FLASKS

(ERLENMEYER FLASKS)

FJ-050

FLASKS, conical, narrow mouth, *Pyrex brand* glass. All sizes with vial neck as illustration on opposite page.

Capacity	5	10	25	50	100 ml	
Std. pack qty.	60	60	120	144	144	
Std. pack	103/–	112/–	243/–	324/–	335/–	*d*
Dozen	21/6	24/–	43/–	30/–	31/–	
Each	3/4	3/7	5/–	4/–	4/1	

Capacity	150	200	250	300	350 ml	
Std. pack qty.	72	72	72	72	72	
Std. pack	178/–	189/–	194/–	232/–	243/–	*d*
Dozen	32/–	34/–	34/–	41/–	43/–	
Each	4/2	4/3	4/4	4/10	5/–	

Capacity	500	750	1000	1500 ml	
Std. pack qty.	72	48	36	36	
Std. pack	270/–	212/–	224/–	299/–	*d*
Dozen	48/–	56/–	78/–	104/–	
Each	5/4	6/–	7/6	9/6	

Capacity	2	3	4	5	6 litres	
Std. pack qty.	24	15	12	6	4	
Std. pack	250/–	226/–	225/–	134/–	103/–	*d*
Dozen	125/–	185/–	—	—	—	
Each	11/6	16/9	20/9	24/9	28/9	

FJ-051

FLASKS, as FJ-050, with enamelled capacity scale.

Capacity	250	500 ml	
Sub divisions	25	50 ml	
Std. pack qty.	12	12	
Std. pack	43/–	56/–	*d*
Each	5/–	6/–	

FJ-052

FLASKS, conical, narrow mouth, *Firmasil* glass.

Capacity	25	50	100 ml	
Std. pack qty.	144	144	144	
Std. pack	289/–	289/–	353/–	*d*
Dozen	26/9	26/9	32/9	
Each	3/9	3/9	4/2	

Capacity	150	250	500 ml	
Std. pack qty.	96	72	72	
Std. pack	235/–	196/–	255/–	*d*
Dozen	32/9	36/3	47/3	
Each	4/2	4/4	5/2	

FJ-056

FLASKS, conical, narrow mouth, *Davisil* glass, to BS 2734.

Capacity	100	250	500	1000 ml	
Std. pack qty.	24	12	12	12	
Std. pack	50/–	31/–	40/3	62/9	*d*
Dozen	25/3	—	—	—	
Each	3/8	4/1	4/10	6/6	

FJ-058

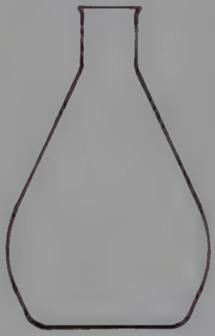
FLASKS, conical, with interchangeable socket, Ⓐ, borosilicate glass. Socket 24/29 without stopper.

Capacity	100	250	500	1000 ml	
Dozen	90/–	100/–	114/–	145/–	*a*
Each	8/6	9/3	10/3	13/3	

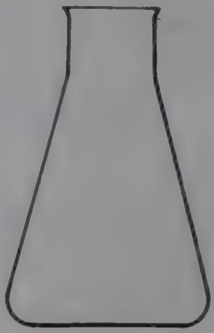
STOPPERS, suitable for above flasks see

SU-520	**Hollow blown glass**	For prices see entries in List No. sequence.
Q-SB24	**Quickfit**	
SU-700	**Polypropylene dustproof** ...	

FLASKS, conical, semi-micro with 14/15 neck socket, see FD-672 in List No. sequence.



FJ-060



FJ-070

TAYLOR CONICAL FLASKS

FJ-060

FLASKS, Taylor conical, *Pyrex brand* glass.

Capacity	200	300	500	1000 ml	
Std. pack qty.	24	24	24	12	
Std. pack	75/–	81/–	101/–	67/–	d
Dozen	38/–	42/–	52/–	—	
Each	4/8	4/10	5/8	6/10	

WIDE MOUTH CONICAL FLASKS

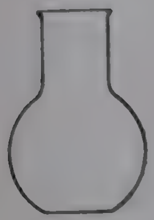
FJ-070

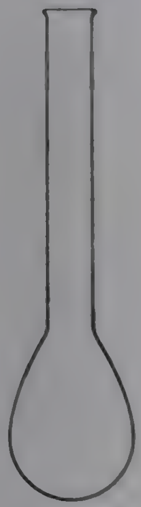
FLASKS, conical, wide mouth, *Pyrex brand* glass. Illustration of neck finishes see opposite page.

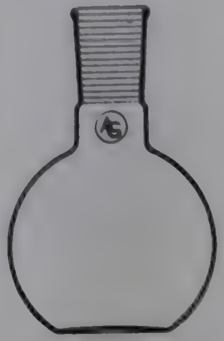
Capacity	50	100	250	500 ml	
Neck finish	V	V	V	V	
Std. pack qty.	144	96	72	48	
Std. pack	324/–	237/–	205/–	180/–	d
Dozen	30/–	32/–	36/–	47/–	
Each	4/–	4/2	4/6	5/4	

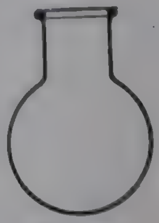
Capacity	750	1000	2000 ml	
Neck finish	V	V	TR	
Std. pack qty.	48	36	24	
Std. pack	219/–	224/–	263/–	d
Dozen	58/–	78/–	135/–	
Each	6/–	7/6	12/3	

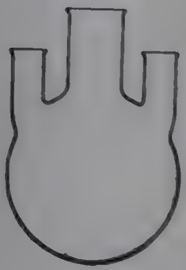
All items on this page normally available from stock.

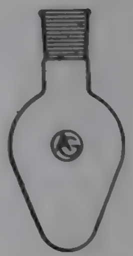

FJ-100

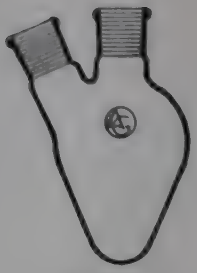

FJ-160
FJ-170


FJ-110


FJ-120


FJ-140


FJ-195


FJ-196

EXTRACTION FLASKS

FJ-100

FLASKS, extraction, *Pyrex brand* glass, with flat bottom and wide vial neck.

Capacity	50	100	150	250	500	1000 ml	
Std. pack qty.	144	96	72	120	60	36	
Std. pack	356/-	273/-	216/-	432/-	279/-	248/-	d
Dozen	33/-	37/-	38/-	47/-	59/-	86/-	
Each	4/2	4/6	4/8	5/4	6/2	8/3	

FJ-110

FLASKS, extraction, flat bottom, Ⓐ, short neck with standard socket, borosilicate glass.

Capacity	150	150	250	350	500 ml	
Socket	19/26	24/29	24/29	29/32	29/32	
Dozen	90/-	96/-	100/-	114/-	120/-	a
Each	8/6	9/-	9/3	10/3	11/-	

EV-570

FLASK, extraction, to ASTM D297, *Pyrex brand* glass. See entry in List No. sequence.

BOLTHEAD FLASKS

FJ-120

FLASKS, bolthead, *Pyrex brand* glass with tooled ring neck as illustration on page 284.

Capacity	50	100	250	500	1000 ml	
Std. pack qty.	144	72	72	30	36	
Std. pack	389/-	232/-	281/-	137/-	259/-	d
Dozen	36/-	41/-	50/-	57/-	90/-	
Each	4/5	4/10	5/6	6/-	8/6	

Capacity	2	3	5	10 litres	
Std. pack qty.	18	12	6	4	
Std. pack	233/-	207/-	155/-	218/-	d
Dozen	155/-	—	—	—	
Each	14/6	19/3	28/9	60/9	

THREE NECK FLASKS

FJ-140

FLASKS, with three necks, *Pyrex brand* glass.

Capacity	250	500	1000	2000 ml	
Std. pack qty.	12	12	6	6	
Std. pack	187/-	210/-	129/-	170/-	d
Each	17/3	19/6	24/-	31/6	

Capacity	3	5	10 litres	
Std. pack qty.	6	4	2	
Std. pack	218/-	201/-	137/-	d
Each	40/3	56/-	76/6	

KJELDAHL FLASKS

FJ-160

FLASKS, Kjeldahl, with long neck, *Pyrex brand* glass.

Capacity	50	100	200	300 ml	
Std. pack qty.	144	36	72	60	
Std. pack	529/-	140/-	372/-	337/-	d
Dozen	48/-	48/-	66/-	72/-	
Each	5/4	5/4	6/8	7/2	

Capacity	500	800	1000 ml	
Std. pack qty.	36	36	24	
Std. pack	224/-	267/-	187/-	d
Dozen	78/-	92/-	96/-	
Each	7/6	8/9	9/-	

FJ-170

FLASK, Kjeldahl, micro, borosilicate glass, capacity 30 ml ... ... Dozen £2. 6. 0. Each £0. 5. 2. *a*

SEMI-MICRO FLASKS

FJ-195

FLASK, semi-micro, Ⓐ, pear shape, short neck with 14/15 socket, capacity 30 ml, borosilicate glass.
Dozen £3. 14. 0. Each £0. 7. 4. *a*

FJ-196

FLASK, semi-micro, Ⓐ, pear shape with 2 necks 14/15 sockets, capacity 30 ml, borosilicate glass.
Dozen £6. 15. 0. Each £0. 12. 3. *a*

FD-672

FLASKS, semi-micro Ⓐ, conical, in capacities 5 to 25 ml with 14/15 socket neck. For prices see entry in List No. sequence.

BJ-725	**BEAKER FLASKS,** *Pyrex brand* glass.
FM-328	**FLASKS,** round bottom, short neck with cone joint and hooks for spring connectors.

See entries in List No. sequence.

QUANTITY DISCOUNTS for glassware in bulk quantities see 'Conditions of Sale'.

All items on this page normally available from stock.

THORPE AND IODINE FLASKS

FJ-210

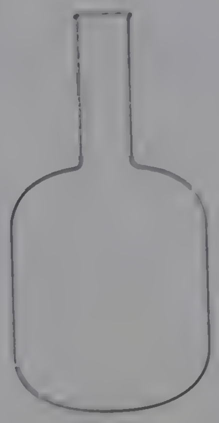
FLASK, Thorpe's revenue, *Pyrex brand* glass. Capacity 750 ml. Std. pack qty. 6.
Std. pack £1.14. 0. Each £0. 6. 8. *d*

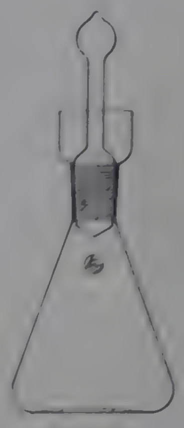
FJ-260

FLASK, iodine determination, Ⓖ, borosilicate glass. Conical with cup shaped neck and long handled stopper, cone and socket 24/29. Capacity 250 ml.
Dozen £13.15. 0. Each £1. 5. 0. *a*

COMPONENTS

FJ-261	**Flask only, borosilicate glass.** Dozen	£9.15. 0.	Each	£0.17. 6.	*a*
FJ-262	**Stopper only, borosilicate glass.** Dozen	£3.18. 0.	Each	£0. 7. 8.	*a*


FJ-210


FJ-260

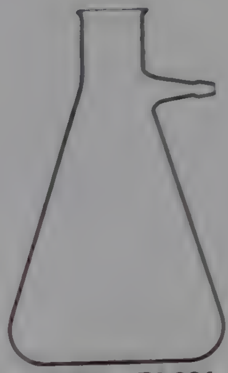
FILTER FLASKS

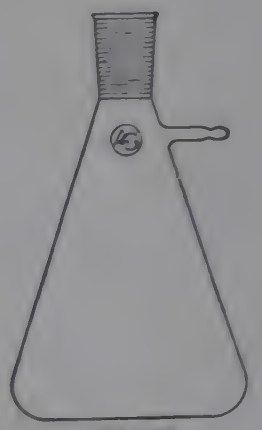
FJ-280

FLASKS, filter, with side arm, heavy wall, *Pyrex brand* glass, conforming dimensionally to BS 1739. Neck finish as illustrated on page 284.

Capacity	100	250	500	1000 ml	
Neck finish	V	V	V	V	
Std. pack qty.	36	36	24	18	
Std. pack	270/-	324/-	295/-	286/-	*d*
Dozen	94/-	112/-	150/-	195/-	
Each	8/9	10/3	13/9	17/9	

Capacity	2	4	5	10 litres	
Neck finish	V	V	V	TR	
Std. pack qty.	12	6	4	4	
Std. pack	272/-	277/-	223/-	288/-	*d*
Each	25/3	51/3	62/-	80/-	


FJ-280 FJ-286


FJ-290

FJ-286

FLASKS, filter, with side arm and wide mouth, heavy wall *Davisil* glass, to BS 1739.

Capacity	100	250	500	1000 ml	
Std. pack qty.	24	12	12	12	
Std. pack	210/-	114/3	134/3	157/3	*d*
Dozen	106/-	—	—	—	
Each	9/9	10/6	12/3	14/6	

FJ-290

FLASKS, filter, Ⓖ conical, heavy wall borosilicate glass with sidearm and 29/32 socket.

Capacity	500	1000 ml	
Dozen	255/-	300/-	*a*
Each	23/6	27/-	

DISTILLATION FLASKS

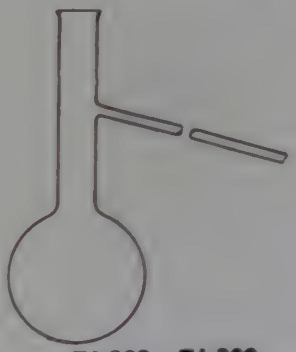
FJ-298

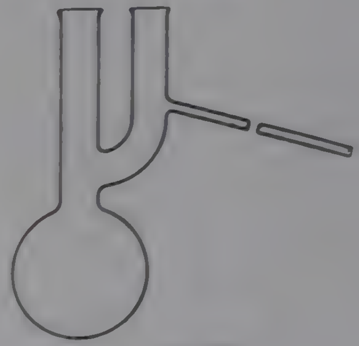
FLASKS, distillation, *Pyrex brand* glass, with side arm.

Capacity	25	50	100	150 ml	
Std. pack qty.	24	24	36	36	
Std. pack	95/-	117/-	229/-	251/-	*d*
Dozen	49/-	60/-	80/-	88/-	
Each	5/4	6/2	7/8	8/3	

Capacity	250	500	1000	2000 ml	
Std. pack qty.	24	18	12	6	
Std. pack	191/-	167/-	131/-	86/-	*d*
Dozen	98/-	114/-	—	—	
Each	9/-	10/4	12/2	16/-	

QUANTITY DISCOUNTS for glassware in bulk quantities see 'Conditions of Sale'.


FJ-298 FJ-300


FJ-320

FJ-300

FLASKS, distillation, *Pyrex brand* glass, conforming dimensionally to BS 658.

Capacity	100	130	150 ml	
Std. pack qty.	36	36	36	
Std. pack	243/-	254/-	262/-	*d*
Dozen	84/-	88/-	90/-	
Each	8/-	8/3	8/6	

Capacity	250	500	750	1000 ml	
Std. pack qty.	24	18	12	12	
Std. pack	187/-	166/-	120/-	123/-	*d*
Dozen	96/-	112/-	—	—	
Each	9/-	10/3	11/3	11/6	

PE-676 et seq.

FLASKS, distillation, to IP and ASTM specifications, see entry in List No. sequence.

FJ-320

FLASKS, Claisen distillation, with side arm on wide branch tube, *Pyrex brand* glass.

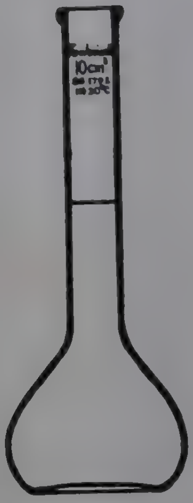
Capacity	100	250 ml	
Std. pack qty.	6	12	
Std. pack	52/-	124/-	*d*
Each	9/9	11/6	

All items on this page normally available from stock.

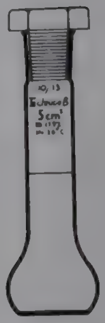
Technico VOLUMETRIC FLASKS

REGD. TRADE MARK

ONE MARK FLASKS TO BS 1792

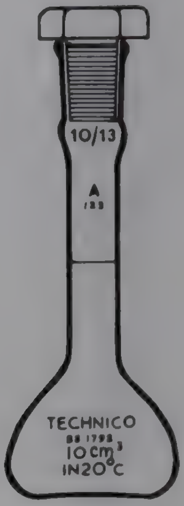


FK-054



FK-074

Small sizes Class B
Wide neck



FK-076
Small sizes Class A
Narrow neck

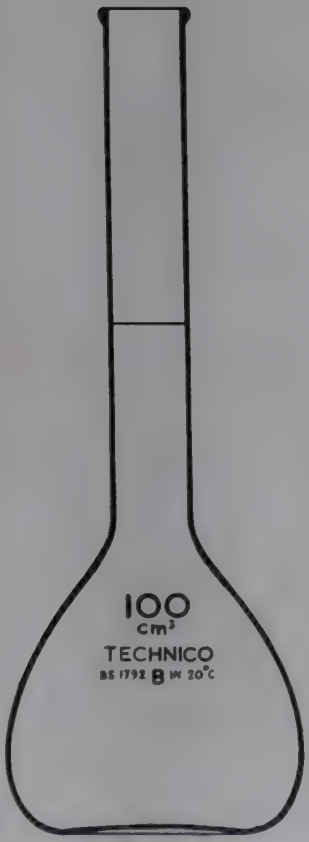
Technico one mark volumetric flasks are manufactured in our own works in accordance with the requirements of BS 1792 (sizes not included in the BS are on a similar basis). Stoppered flasks have interchangeable neck grinding to BS 572 and sizes 1 to 50 cm^3 Class B and 5 to 50 cm^3 Class A all have the same 10/13 stopper size for added convenience and interchangeability. The small flasks in Class B have necks which will accept pipettes up to 8·5 mm dia. Stoppered flasks are supplied complete with hexagon head dust-proof polypropylene stoppers. These stoppers are inert to almost all reagents, will not stick, will prevent entrance of dust and give good protection against chipping. If occasionally for special purposes, glass stoppers are essential then stoppers SU-520 can be used.

CERTIFICATION. The national authority for the independent testing and certification of items of volumetric glassware was transferred in January 1965 from the National Physical Laboratory to the British Standards Test Centre. The former NPL mark and certificate are thus replaced by BST. A new British Calibration Service is in process of formation and it appears likely that there may be a further change of marking at a later date.

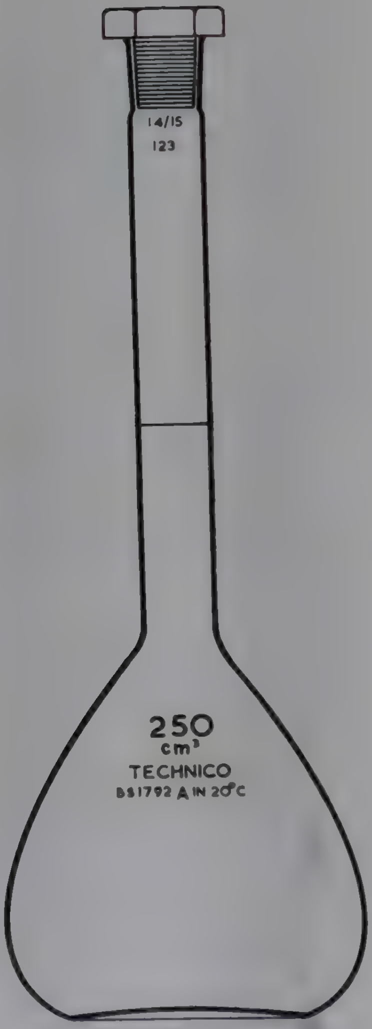
Capacity cm^3	1 *	2 *	5	10	20 *	25	50
Stopper size	10/13	10/13	10/13	10/13	10/13	10/13	10/13
Tolerance							
Class B ±cm^3	0·04	0·04	0·04	0·04	0·06	0·06	0·1
Class A ±cm^3	—	—	0·02	0·02	0·03	0·03	0·05
Capacity cm^3	100	200	250	500	1000	2000	
Stopper size	12/14	14/15	14/15	16/16	19/17	24/20	
Tolerance							
Class B ±cm^3	0·15	0·3	0·3	0·5	0·8	1·2	
Class A ±cm^3	0·08	0·15	0·15	0·25	0·4	0·6	

* **Sizes not included in BS 1792.**

When ordering specify *Technico* volumetric glassware.



FK-054



FK-074, FK-076, etc.

Larger sizes classes A and B

PLAIN NECK FLASKS WITHOUT STOPPER

FK-054

FLASKS, *Technico,* **Class B,** plain neck, as specification.

Capacity	10	25	50 cm^3	
Dozen	**57/–**	**64/–**	**66/–**	*a*
Each	**6/–**	**6/6**	**6/8**	
Capacity	100	250	500 cm^3	
Dozen	**70/–**	**88/–**	**114/–**	*a*
Each	**7/–**	**8/3**	**10/3**	

All items on this page normally available from stock.

Technico VOLUMETRIC FLASKS

REGD. TRADE MARK

FLASKS GROUND NECK WITH DUSTPROOF POLYPROPYLENE STOPPERS

ONE MARK FLASKS TO BS 1792

FK-074

FLASKS, *Technico,* **Class B,** as specification, with interchangeable polypropylene stopper.

Capacity	1 *	2 *	5	10	20 * cm^3	
Dozen	**59/–**	**59/–**	**59/–**	**66/–**	**74/–**	*a*
Each	**6/2**	**6/2**	**6/2**	**6/8**	**7/4**	

Capacity	25	50	100	200 cm^3	
Dozen	**74/–**	**80/–**	**88/–**	**100/–**	*a*
Each	**7/4**	**7/10**	**8/3**	**9/3**	

Capacity	250	500	1000	2000 cm^3	
Dozen	**108/–**	**130/–**	**175/–**	**310/–**	*a*
Each	**10/–**	**11/9**	**16/–**	**28/–**	

*** Sizes not included in BS 1792.**

FK-076

FLASKS, *Technico,* **Class A,** as specification, with interchangeable polypropylene stopper.

Capacity	5	10	20	25	50	100 cm^3	
Dozen	**96/–**	**100/–**	**114/–**	**114/–**	**118/–**	**125/–**	*a*
Each	**9/–**	**9/3**	**10/3**	**10/3**	**10/9**	**11/3**	

Capacity	200	250	500	1000	2000 cm^3	
Dozen	**140/–**	**140/–**	**175/–**	**225/–**	**370/–**	*a*
Each	**12/9**	**12/9**	**16/–**	**20/6**	**34/–**	

FK-077

FLASKS, *Technico,* **Class A with works certificate** showing value of correction, and interchangeable polypropylene stopper.

Capacity	5	10	20	25	50	100 cm^3	
Dozen	**108/–**	**114/–**	**125/–**	**125/–**	**130/–**	**135/–**	*a*
Each	**10/–**	**10/3**	**11/3**	**11/3**	**11/9**	**12/3**	

Capacity	200	250	500	1000	2000 cm^3	
Dozen	**150/–**	**155/–**	**185/–**	**250/–**	**380/–**	*a*
Each	**13/6**	**14/–**	**17/–**	**23/–**	**35/–**	

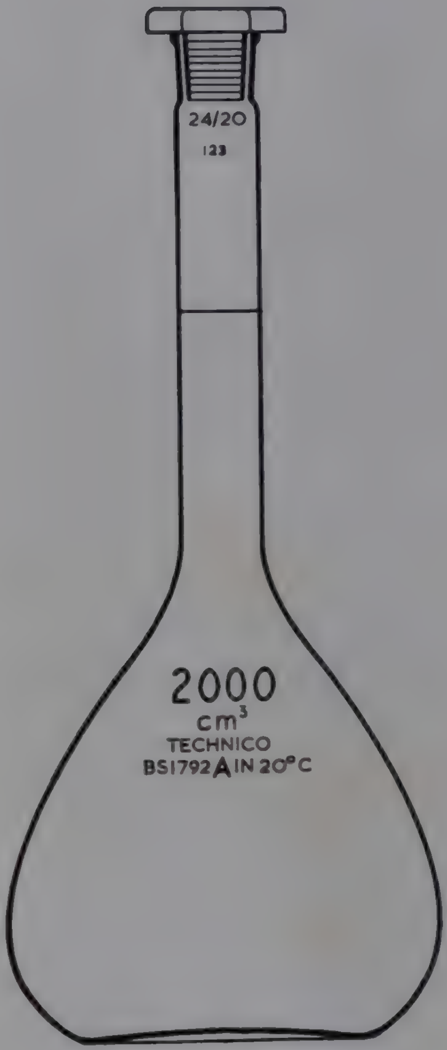
FK-078

FLASKS, *Technico,* **BST stamped Class A** with certificate, and interchangeable polypropylene stopper.

Capacity	5	10	25	50	100 cm^3	
Each	**72/–**	**73/–**	**74/–**	**74/–**	**75/–**	*a*

Capacity	200	250	500	1000	2000 cm^3	
Each	**76/–**	**76/–**	**78/–**	**83/–**	**93/–**	*a*

SU-520 **Stoppers,** hollow blown glass, suitable for above flasks. For prices see entry in List No. sequence.



FK-076
FK-077
FK-078

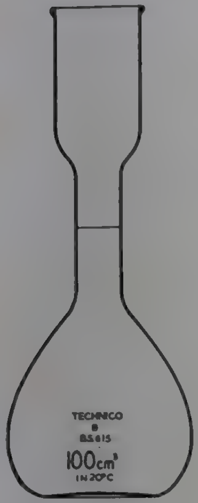
AMBER GLASS FLASKS

FK-084

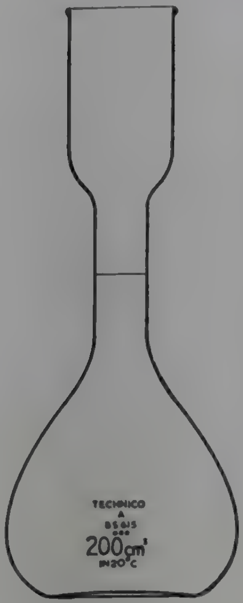
FLASKS, *Technico,* **Class B** low-actinic **amber stained glass** with interchangeable polypropylene stopper. Shape as FK-074.

Capacity	100	250	500	1000 cm^3	
Dozen	**140/–**	**165/–**	**200/–**	**285/–**	*a*
Each	**12/9**	**15/–**	**18/–**	**26/–**	

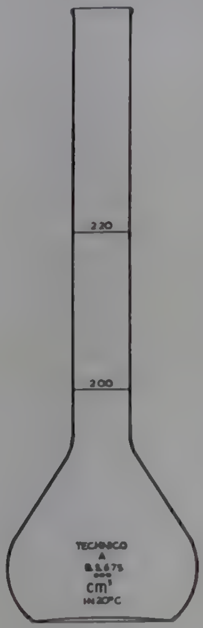
All items on this page normally available from stock.



FK-134



FK-136



FK-166

Technico

REGD. TRADE MARK

VOLUMETRIC FLASKS

KOHLRAUSCH FLASKS

FK-134

FLASKS, Kohlrausch, *Technico*, BS 615, **Class B.**

Capacity	50	100	200 cm³	
Dozen	**108/–**	**118/–**	**140/–**	*a*
Each	**10/–**	**10/9**	**12/9**	

FK-136

FLASKS, Kohlrausch, *Technico*, to BS 615, **Class A.**

Capacity	50	100	200 cm³	
Dozen	**165/–**	**200/–**	**220/–**	*a*
Each	**15/–**	**18/–**	**20/–**	

SUGAR FLASKS

FK-164

FLASKS, sugar, *Technico*, to BS 675 type 1, **Class B.**

Capacity	50/55	100/110	200/220 cm³	
Dozen	**100/–**	**114/–**	**125/–**	*a*
Each	**9/3**	**10/3**	**11/3**	

FK-166

FLASKS, sugar, *Technico*, to BS 675 type 1 ,**Class A.**

Capacity	50/55	100/110	200/220 cm³	
Dozen	**150/–**	**170/–**	**190/–**	*a*
Each	**13/6**	**15/6**	**17/6**	

FK-176

FLASKS, sugar, *Technico*, to BS 675 type 2, **Class A.**
Capacity 100 cm³ with narrow neck.
Dozen **£12. 15. 0.** Each **£1. 3. 6.** *a*

For illustration see opposite page.

PYREX BRAND VOLUMETRIC FLASKS

FK-094

FLASKS, to BS 1792, *Pyrex brand* glass, **Class B,** with interchangeable solid glass stopper.

Capacity	25	50	100	200 cm³	
Std. pack qty.	12	12	12	12	
Std. pack	**140/–**	**146/–**	**151/–**	**156/–**	*d*
Each	**13/–**	**13/6**	**14/–**	**14/6**	

Capacity	250	500	1000	2000 cm³	
Std. pack qty.	12	6	6	1	
Std. pack	**156/–**	**91/–**	**109/–**	—	*d*
Each	**14/6**	**16/9**	**20/3**	**23/–**	

FK-096

FLASKS, to BS 1792, *Pyrex brand* glass, **Class A,** with interchangeable solid glass stopper.

Capacity	25	50	100	200 cm³	
Std. pack qty.	12	12	12	12	
Std. pack	**187/–**	**194/–**	**201/–**	**209/–**	*d*
Each	**17/4**	**18/–**	**18/8**	**19/4**	

Capacity	250	500	1000	2000 cm³	
Std. pack qty.	12	6	6	1	
Std. pack	**209/–**	**121/–**	**146/–**	—	*d*
Each	**19/4**	**22/5**	**27/–**	**30/9**	

When ordering specify *Technico* volumetric glassware.

All items on this page normally available from stock.

Technico VOLUMETRIC FLASKS

REGD. TRADE MARK

BREWERS' MASH FLASKS

FK-204

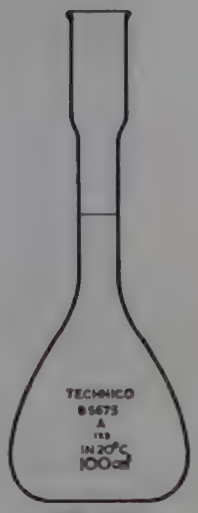
FLASKS, brewers' mash, *Technico,* to BS 701, **Class B,** with two marks at 500 and 515 cm³.

Dozen **£8. 10. 0.** Each **£0. 15. 6.** *a*

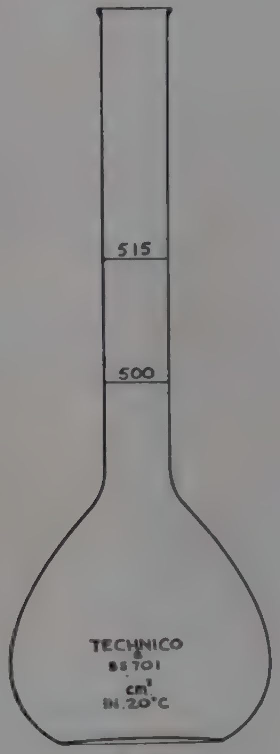
FK-206

FLASKS, *Technico,* as FK-204 but **Class A.**

Dozen **£12. 5. 0.** Each **£1. 2. 6.** *a*



FK-176



FK-204
FK-206

HIRSCHSOHN FLASKS

Capacity of bulb	45	150	200 cm³
Capacity of neck	5	10	25 cm³
Neck subdivision	0·1	0·1	0·2 cm³
Shape, fig.	a	b	b

FK-244

FLASKS, Hirschsohn, *Technico,* to BS 676, **Class B.**

Capacity	45	150	200 cm³	
Dozen	**140/–**	**255/–**	**290/–**	*a*
Each	**12/9**	**23/6**	**26/6**	

FK-246

FLASKS, Hirschsohn, *Technico,* to BS 676, **Class A.**

Capacity	45	150	200 cm³	
Dozen	**185/–**	**310/–**	**360/–**	*a*
Each	**17/–**	**28/–**	**33/–**	

PE-120

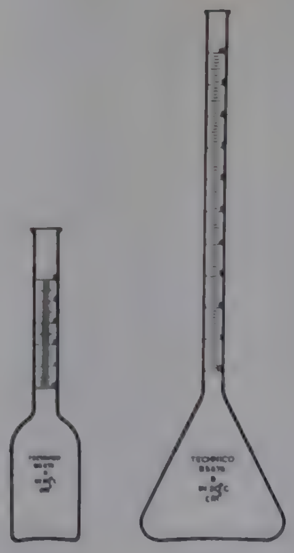
SULPHONATION FLASK, to ASTM D1019-IP 145. For details see entry in List No. sequence.

STOHMANN FLASKS

FK-263

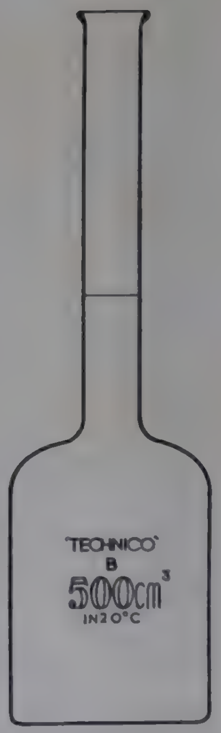
FLASKS, VOLUMETRIC, Stohmann, *Technico,* graduated one mark.

Capacity	500	1000 cm³	
Dozen	**135/–**	**180/–**	*a*
Each	**12/3**	**16/6**	



(a) (b)

FK-244
FK-246



FK-263

When ordering specify *Technico* volumetric glassware.

REGD. TRADE MARK

Gallenkamp GAS FLOWMETERS

ORIFICE FLOWMETER

This gas flowmeter is a compact and robust instrument of the orifice type which measures the pressure drop across a jet. The jet is fitted into the main body which is bored out to form one limb of a manometer. The other limb is a glass tube fitted with an 8 cm adjustable scale, providing easy zero adjustment and clear reading. A fine adjustment needle valve is fitted as an integral part of the main body. The whole instrument can be dismantled easily for cleaning, topping-up or for jet changing. It is not suitable for corrosive gases.

INTERCHANGEABLE JETS

The flowmeters are available with any one of five interchangeable jets which together cover an effective air-flow range from 0·07 to 5 litres per minute.

CALIBRATION

A flowmeter will, on request, be fitted with a selected jet and calibrated, but for air only. The certificates of calibration which are supplied with such flowmeters show measured values at five points on the scale from which a calibration curve may be constructed.

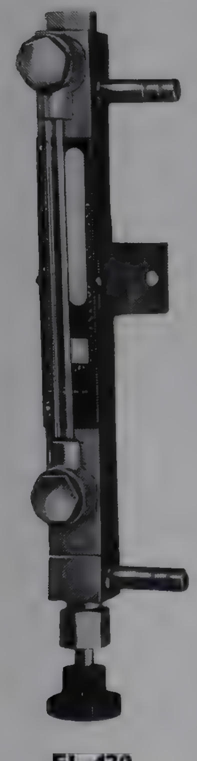
FL-420

FLOWMETER, ORIFICE, *Gallenkamp*, as specification, with nozzles for rubber tubing connections. **Uncalibrated with one jet FL-430** ... Each **£11. 0. 0.** *b*

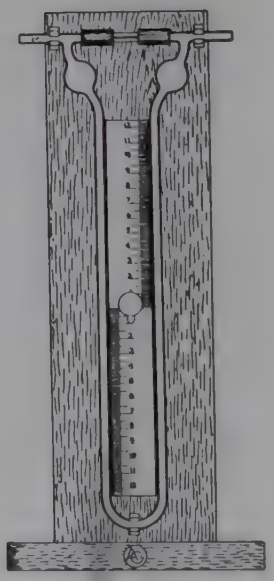
FL-422

FLOWMETER, ORIFICE, *Gallenkamp*, as FL-420 but calibrated with jet as selected. Complete with jet and certificate of calibration ... ... Each **£12. 3. 6.** *b*

When ordering please state jet size No. required.



FL-420



FL-550

GAS METERS see GF-052 et seq. in List No. sequence

FL-430

JETS, interchangeable, uncalibrated, for flowmeters FL-420 and FL-422, with washer.

No.	1	2	3
Range	0·07–0·25	0·15–0·5	0·4–1·25 litres/min

No.	4	5
Range	0·8–2·5	1·5–5·0 litres/min

Each **£0. 7. 6.** *b*

FL-432

JETS, as FL-430 but calibrated. With certificate. Each **£1.11. 0.** *b*

REPLACEMENT PARTS

FL-434	**Gauge glass.**	**Dozen £0. 8. 0. Each £0. 2. 6.**	**b**
FL-435	**Spare washers for jets ... ...**	**Dozen £0. 2. 6.**	**b**

CAPILLARY FLOWMETER

This flowmeter comprises a glass U-tube manometer across the top of which is connected a short length of precision bore capillary. Various ranges are obtained by inserting capillaries of different bores. The readings are taken on a 25 cm boxwood scale divided in mm with centre zero. The meter is mounted on a polished hardwood stand, to which the glass U-tube is attached by spring clips so that it may easily be removed for cleaning.

CALIBRATION

A flowmeter will, on request, be fitted with a selected capillary tube and calibrated, but for air only. The certificates of calibration which are supplied with such flowmeters show measured values at five points on the scale from which a calibration curve may be constructed.

FL-550

FLOWMETER, CAPILLARY, (AG), as specification, with one capillary as selected. **Uncalibrated.** Each **£6. 0. 0.** *a*

When ordering please state required capillary size No. as shown under List No. FL-554.

FL-552

FLOWMETER, CAPILLARY, (AG), as FL-550 but calibrated with capillary as selected. **With certificate.** Each **£7. 7. 6.** *a*

FL-554

CAPILLARY TUBES, covering the following air flow ranges.

Size No.	1	2	3	4	5	6
Range 0 to	10	25	50	100	250	500 ml/min

Size No.	7	8	9	10
Range 0 to	1	2·5	5	10 litres/min

Each **£0. 2. 6.** *a*

FL-556

CAPILLARY TUBES, as FL-554 but calibrated. With certificate ... ... Each **£1. 9. 6.** *b*

REPLACEMENT PART

FL-558 U-tube, borosilicate glass ... Each £0 13. 6. a

All items on this page normally available from stock.

FLOWMETER LAB KIT

FOR MEASUREMENT OF RATE OF FLOW OF GASES AND LIQUIDS

The meter gives continuous and direct measurements of rates of flow of gases and liquids in pipelines. It consists of a vertical glass metering tube with scale 100 mm long in which a floating indicator is supported by the upward flow. The float rotates steadily and without touching the metering tube so friction, and therefore wear, is eliminated. Positive scale readings are obtained.

CONSTRUCTION

All parts are strictly interchangeable. The metering tubes are precision tapered bore tubes with cylindrical ends which allow a leak proof seal to be made with an 'O' ring located in a groove in each stainless steel nozzle connector. Nozzles are fitted for rubber tubing connections. A clip-on plastics front gives complete protection to the metering tube. Floats are in anodised aluminium or stainless steel depending upon the range. They are compact and thus allow the scale to occupy most of the tube length. The scale on the metering tube is legible and permanent.

Interchangeability means that both floats and metering tubes may be changed easily and quickly.

FL-600

RANGES

The kit includes five metering tubes and nine floats which provide flow rates for air and water as shown below and for which calibration charts are supplied. Calibration for other fluids can be carried out to special order if required.

Standard ranges for air

Tube	Float	Range
A1	4·42/D	25 – 500 ml/min
A1	4·42/HS	50 – 1,000 ml/min
C6	9·60/D	100 - 2,000 ml/min
C6	9·65/HS	200 – 4,000 ml/min
B6	9·60/D	500 – 5,000 ml/min
B6	9·65/HS	1 – 10 l/min
A6	9·60/D	1 – 12 l/min
A6	9·65/HS	2·5 – 25 l/min
A10	14·42/D	5 – 50 l/min
A10	14·5/HS	10 – 100 l/min

Standard ranges for water

Tube	Float	Range
A1	4·37/SS	7·5 – 75 ml/min
B6	9·65/HS	25 – 250 ml/min
A6	9·65/HS	75 – 750 ml/min
A6	9·55/SS	200 – 1,500 ml/min
A10	14·5/HS	300 – 3,000 ml/min
A10	14·4/SS	500 – 5,000 ml/min

FL-600

FLOWMETER LAB-KIT, *Gapmeter*. This is a most versatile set of calibrated flowmeters covering a wide range of rates of flow. It comprises five metering tubes, nine floats, three pairs of nozzle connections, mounting frame and a dismountable tripod stand. Any of the ten standard Gapmeter ranges for air from 25 ml/min to 100 l/min and six for water from 7·5 ml/min to 5 l/min may be readily assembled. Calibration charts are supplied for the sixteen ranges. The Lab-Kit is supplied in a wood carrying case with moulded foam-plastics compartments.

Each **£30. 0. 0.** *m*

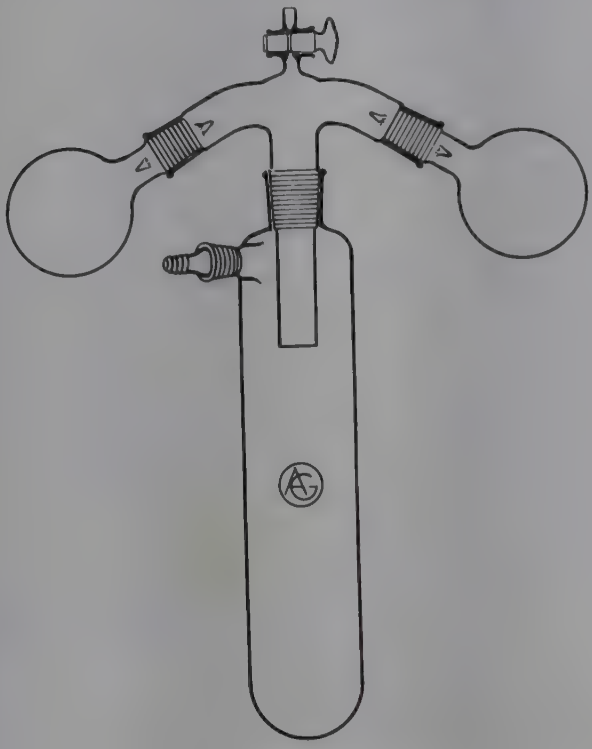
Replacement metering tubes and floats are available; details on application.

FOIL, aluminium
see ALUMINIUM
FORCEPS, balance weight
see BALANCE ACCESSORIES
, dissecting see DISSECTING EQUIPMENT
FRACTION COLLECTORS
see CHROMATOGRAPHY
FRACTIONATING COLUMNS
see DISTILLATION and
QUICKFIT APPARATUS

All items on this page normally available from stock.

FREEZE DRYING APPARATUS

For drying labile and other biological substances by the sublimation of ice from pre-frozen solutions contained in flasks.



FM-320

PRINCIPLE

Ice can be removed from evenly distributed films of frozen solution at an average of 40 g/h using a vacuum of 0·4 torr or better. The collecting trap should be immersed in a vacuum flask containing liquid air or solid CO_2–ethanol mixture to condense the evaporated moisture. The working capacity of the apparatus is up to approx. 500 ml.

CONSTRUCTION

The apparatus consists of a head with four sidearms each with a 24/29 socket on which four 250 ml flasks with 24/29 cones are fitted. The head which has one 34/35 cone fits into the 34/35 socket of the trap. A vacuum connector arm is situated at the top of the trap and the head is fitted with a vacuum relief stopcock.

FM-320

FREEZE DRYING APPARATUS, Ⓐ, borosilicate glass, as specification, with four pairs of spring connectors, 38 mm long ... ... Each **£10. 0. 0.** *a*

COMPONENTS

FM-322	**Head,** with 34/35 cone, four sidearms with 24/29 sockets, hooks for spring connectors and a vacuum-release stopcock ... ... Each **£4. 8. 0.**	*a*
FM-324	**Trap,** with 34/35 socket and sidearm with 19/26 socket. Dia. 65mm, length to neck 330 mm. Each **£2. 11. 0.**	*a*
Q-MF10/2	**Adapter,** with 19/26 cone for vacuum connection. For price see entry in QUICKFIT APPARATUS.	
FM-328	**Flasks,** with 24/29 cone and hooks for spring connectors.	

Capacity	100	250	500 ml
Dozen	**130/–**	**145/–**	**165/–**
Each	**11/9**	**13/3**	**15/–**

JR-140 **Spring connectors,** length 38 mm. For price see entry in List No. sequence.

Suitable **vacuum flask** for refrigerant see **VC-530,** 4500 ml.

Suitable **rotary pump,** single stage, see **VACUUM PUMPS.**

QUICKFIT FREEZE DRYING APPARATUS see Q-1LT under QUICKFIT APPARATUS.

FM-350

EDWARDS FREEZE DRYING APPARATUS

Speedivac **Model 10P**

For small scale drying of pre-frozen material contained in ampoules or bottles, with a total capacity of 1500 ml. By primary drying, the unit can remove up to 2·4 litres of ice and reduce the moisture content to approximately 1%, by weight. During secondary drying, the refrigerant container is replaced by a tray of phosphorus pentoxide which removes most of the remaining moisture.

CONSTRUCTION

Consists of vacuum condenser chamber, internally metallized, supported in a cradle with a protective screen, having a metal cover with six copper connectors and two vacuum unions for connecting vacuum gauge and pump. A 5 litre glass flask for the refrigerant, with its neck protruding through the metal cover, fits into the condenser chamber.

FM-350

FREEZE DRYING UNIT, *Speedivac* **Model 10P,** as specification, with rubber stoppers for sealing drying ports not in use ... ... Each **£80. 0. 0.** *fN*

ACCESSORIES

FM-352 **Ampoule drying attachment,** with thirty connectors, for drying and vacuum sealing material in ampoules. Each **£22. 10. 0.** *fN*

Suitable **vacuum gauge,** Pirani type, see VC-100 with gauge head VC-104 and adapter VC-105 in List No. sequence.

Suitable **rotary pump,** VB-115 in List No. sequence.

Items on this page normally available from stock except those coded *N*.

EDWARDS CENTRIFUGAL FREEZE DRYING APPARATUS

Speedivac **Model 5PS**

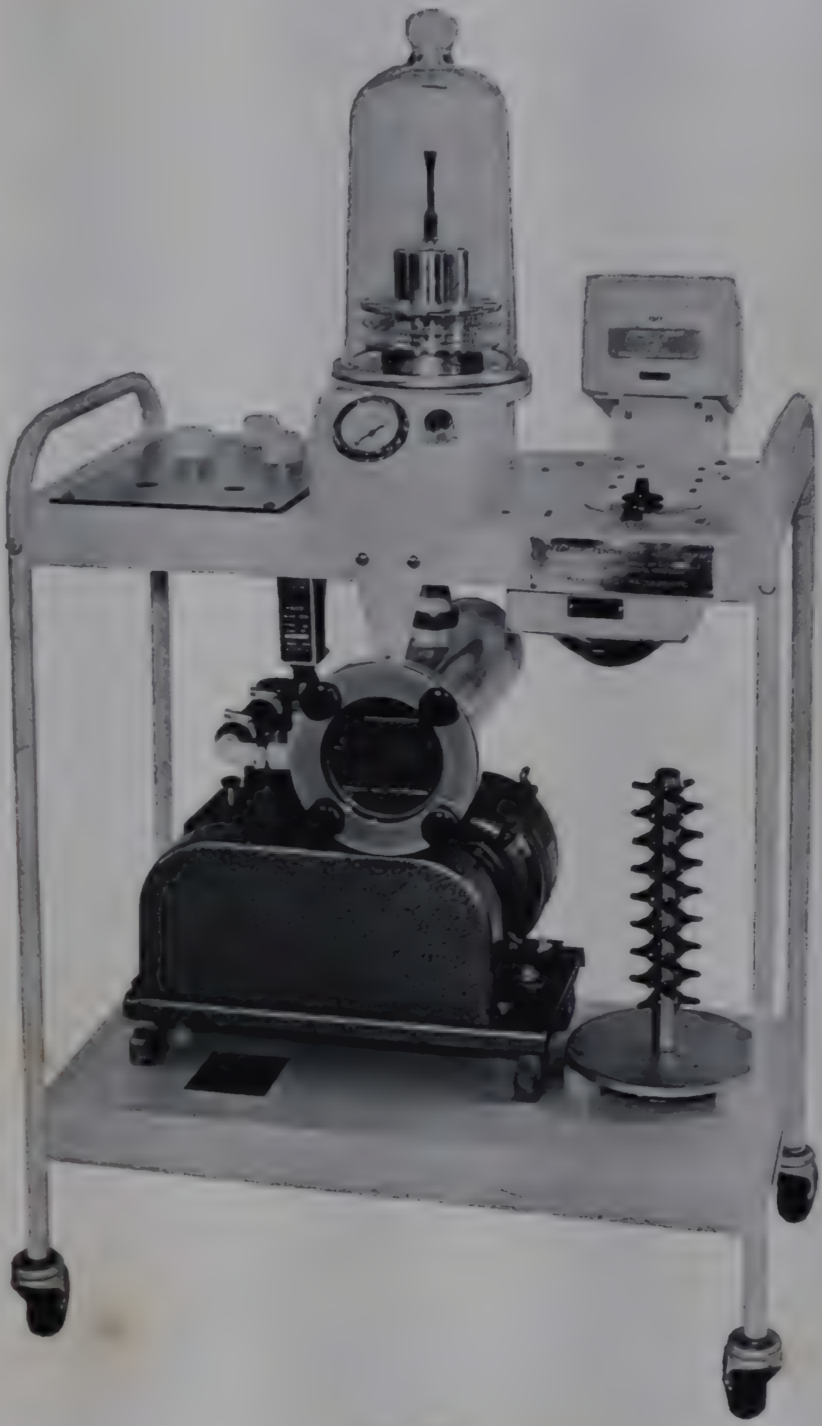
For drying small quantities of material contained in ampoules. The ampoules are centrifuged in the unit, until their contents are distributed on the ampoule walls in an even frozen film. Once the permanent gases are removed by a rotary pump, freeze drying is continued with phosphorus pentoxide desiccant without breaking the vacuum. After removal from the drying chamber, the ampoules can be connected to an ampoule header, evacuated and sealed *in situ*.

CONSTRUCTION

The drying unit is accommodated on the upper shelf of a tubular metal trolley, the lower shelf of which has a *Speedivac* two stage gas ballasted rotary vacuum pump mounted on resilient pads. A glass dome forms the drying chamber, the base of which houses a 1/6 hp centrifuge motor with shield supporting a carrier plate assembly. Carrier plates are provided to accommodate 48×0·5 ml, 12×2·5 ml and 6×5 ml ampoules. The capacity permits a maximum load of 30 ml water to be absorbed. A phosphorus pentoxide moisture trap has a glass inspection window and stainless steel tray.

All controls and gauges are mounted conveniently on the trolley and include a Bourdon dial gauge, a B5 Pirani gauge control unit, and an M6A gauge head.

A vertical header assembly with flanged base and 30 nipples is provided for final evacuation and sealing of ampoules.



FM-390

FM-390

FREEZE DRYING UNIT, CENTRIFUGAL, *Speedivac* **5PS,** as specification, complete on trolley with motorised pump for 220/240V a.c. single phase supplies.
Each **£265. 0. 0.** *fN*

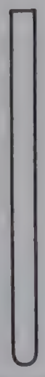
REPLACEMENT PARTS

FM-392 Kit of spares, recommended for above.
Set £23. 2. 0. *fN*

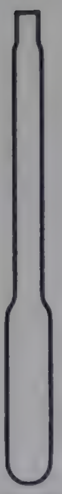
FREEZE DRYING AMPOULES to BS 795

Round bottom ampoules in clear neutral glass BP quality for the freeze drying of pharmaceutical and veterinary preparations, bacterial cultures and virus suspensions. The top 11 mm of the open ends are accurately dimensioned (internal neck diameter 5·9—6·1 mm) and glazed to give minimum wear on the rubber nozzles of the secondary drier. FM-520 and FM-522 are recommended for use with *Speedivac* freeze drying unit FM-390.

List No.	BS type	Nominal capacity ml	Mean overall length mm	Carton quantity	Carton	
FM-520	L/05	0·5	100	525	**70/–**	c
FM-522	K/205	2·5	154	368	**130/–**	c
FM-524	K/10	10·0	158	176	**84/–**	c



FM-520



FM-522
FM-524

Items on this page normally available from stock except those coded *N*.

AG Regd.

FRITTED GLASSWARE FOR FILTRATION

- **Individually tested plates**
- **Porosity controlled within BS 1752**
- **Robust construction**
- **Maximum filtering surface**

Gallenkamp have been making high quality fritted glassware for over twenty-five years. This experience, together with the production control techniques employed, enables us to manufacture filters to closer porosity tolerances than those specified in BS 1752. In the table shown below, it will be noted that there is no possibility of overlap between adjacent ranges of maximum pore diameters, and therefore the performance of each grade is significantly different from the performances of those on either side. This is an important refinement on the wider tolerances permitted by BS 1752 'Laboratory Sintered or Fritted Filters', details of which are also given in the table.

The use of stout wall borosilicate glass tubing ensures robust construction and the fritted plates are well fired to minimise friability.

POROSITIES AND APPLICATIONS

Porosity grade	BS specified range of maximum pore dia.	AG range of maximum pore dia.	Principal uses
	µm	µm	
0	150 – 250	200 – 250	Coarse distribution of gas in liquids.
1	90 – 150	100 – 120	Filtration of very coarse precipitates.
			Support for absorptive layers for filtering gelatinous precipitates.
			Gas distributors in liquids.
			Extraction of coarse grain material.
2	40 – 90	40 – 50	Preparative work with crystalline precipitates.
			Medium gas filters.
			Mercury filters.
			Extraction of medium grain material.
3	15 – 40	20 – 30	Preparative work with fine precipitates.
			Analytical work with medium precipitates.
			Fine gas filters.
			Mercury filters.
			Extraction of fine grain material.
4	5 – 15	5 – 10	Analytical work with very fine precipitates ($BaSO_4$, Cu_2O).
			Preparative work with finest precipitates.
			Safety valves for mercury.
†5	Not greater than 2	1 – 1·8	Bacteriological filtration. (See 'Note on Bacteriological Filters' below).

† NOTE ON BACTERIOLOGICAL FILTERS, POROSITY 5

Pore Size

Filter plates of porosity 5 will retain the commoner types of bacteria of sizes greater than 1·8 micron, but owing to the size range of different organisms it is impossible for us to guarantee these filters bacteriologically.

Filtration Rate

Owing to the very slow filtration rate of a filter plate in porosity 5, when made thick enough for mechanical strength, this grade is supplied as a thin layer of porosity 5 supported by a layer of porosity 3. This construction is to be understood throughout our catalogue whenever reference is made to porosity 5.

Certification

Each filter of porosity 5 is supplied complete with a test certificate showing the maximum pore size and permeability as determined by methods described in BS 1752 'Laboratory Sintered or Fritted Filters.'

TECHNICAL INFORMATION—FRITTED FILTERS

ADVANTAGES OF USE

For filtration

1. Not affected by reagents such as ammonia or sulphuric acid which destroy filter paper.
2. Tedious preparation of asbestos filter beds eliminated.
3. Reproducible analytical results assured due to close tolerance control of porosity in manufacture.
4. Constant weight quickly attained by drying at 110°C.
5. Readily cleaned for re-use.
6. Filtration process visible all the time.

For gas absorption and washing

1. Resistant to wet, corrosive gases.
2. Low back pressure on gas line, particularly when using coarse porosity disks.
3. High velocity with relatively low pressure.
4. Cleans the gas stream of suspended material as well as dispersing the gas.

REFERENCE NUMBERS

All (AG) fritted glassware is identified by reference numbers. The first part of the reference number is a pattern number denoting the shape and size of a particular article. Thus:—

10X is a crucible CW-480 with fritted plate 20 mm dia.
25X is a Buchner funnel FP-402 with fritted plate 90 mm dia.

The final figure of the reference number represents the porosity of the fritted plate. Thus:—

A crucible 10X3 has a fritted plate of porosity No. 3
A funnel 25X4 has a fritted plate of porosity No. 4

CLEANING AND CARE OF FRITTED FILTERS

Before use

A new filter should be thoroughly rinsed with hot hydrochloric acid and then with water until a neutral filtrate is obtained, so that any loose glass particles and accumulated dust are removed.

After use

To ensure long and satisfactory service the filter should be flushed immediately after use, in the reverse direction to that used in filtration, and then given a thorough chemical cleaning. The following list of solvents will be found useful.

General cleaning	Potassium permanganate
Organic substances	Potassium permanganate
Fat	Carbon tetrachloride
Albumen	Warm ammonia or hydrochloric acid
Cupric oxide	Hydrochloric acid (hot) with potassium chlorate
Barium sulphate	Sulphuric acid conc. (hot)
Mercury residues	Aqua regia (hot)
Silver chloride	Ammonia

The filter should then be well rinsed, dried and stored in a dust-free place.

Use of potassium permanganate

Potassium permanganate is a satisfactory reagent for removing organic (and many inorganic) deposits; it cleans efficiently without damaging the filter.

The plate should be treated with a 1% aqueous solution of potassium permanganate followed by a few drops of concentrated sulphuric acid. The resulting heat of reaction enhances the oxidising power of the mixture.

The filter is then washed and dried and any residual stain from precipitated manganese dioxide can be removed by treatment with acidified 20 vol. hydrogen peroxide. A final rinse with distilled water normally leaves the plate chemically clean.

DRYING AND IGNITION

Fritted crucibles are specially suitable for precipitates which have to be dried to constant weight at 110°C. They can be used with boiling liquids and placed directly in a drying oven up to 150°C, then left to cool in a desiccator or in the open air. When ignition is required an electric furnace is necessary. The crucibles should be placed in the cold furnace, slowly heated to a temperature not exceeding 580°C and allowed to cool down again to at least 200°C before removal from the furnace. In the case of filters with porosity 5 plates, greater care is needed when heating, especially when the filter plate is wet. These filters should always be placed in a cold oven and heated gradually, since the sudden evolution of steam from the fine pores may set up sufficient pressure within the filter to crack it.

GAS PRESSURE TEST

The approximate pressure necessary to pass air through plates wetted with water at 20°C:

(AG) Porosity grade	Pressure, mm Hg.
0	10
1	20
2	50
3	90
4	350
5	1800

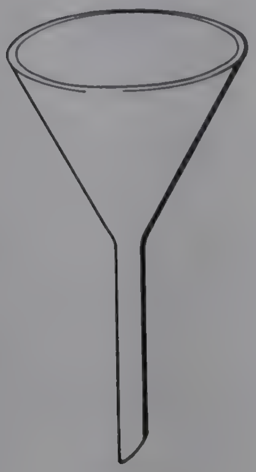
SIZE OF PLATES

All diameters specified for fritted filter plates are nominal and may vary up to 5%. Shrinkage during firing increases with decreasing pore size so that in general a fine porosity plate will have a smaller diameter than a coarse one of the same nominal size.

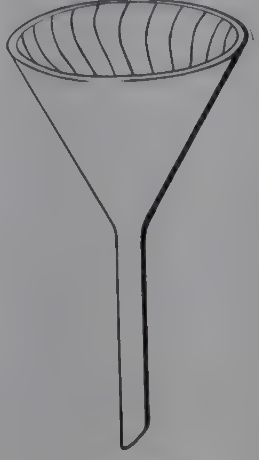
(AG) APPARATUS INCORPORATING FRITTED GLASS FILTERS will be found in this catalogue under the following headings:

	page
Absorption tubes	15
Chromatography columns	140
Crucibles	174
Extraction thimbles, Soxhlet	255
Filter plates and tubes	277
Filter beakers and sticks	278
Filter funnel, Hirsch	301
Filter funnel, Buchner	300
Gas distribution tubes...	387
Gas filter tubes	388
Gas washbottles...	392
Manometer	455
Micro gas generator	496

When ordering please specify (AG) fritted filters and state both List No. and Ref. No.



FP-240
FP-270



FP-245

FUNNEL STANDS see **SM-210** to **SM-244** in List No. sequence.

GLASS FUNNELS

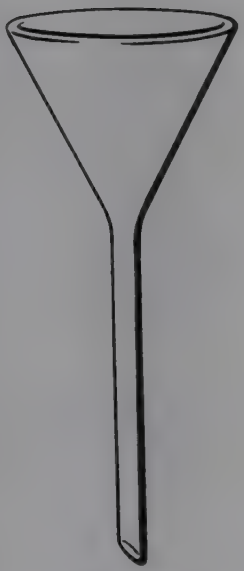
FP-240

FUNNELS, soda glass, plain pattern, to BS 1923 (see table below).

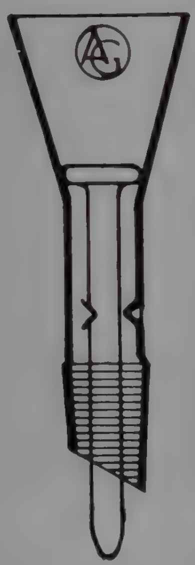
FP-245

FUNNELS, as FP-240 but ribbed (see table below).

List No.	FP-240		FP-245		
Size, cm	Dozen	Each	Dozen	Each	
5	34/-	4/4	34/-	4/4	c
7·5	38/-	4/7	38/-	4/7	c
10	45/-	5/2	45/-	5/2	c
15	78/-	7/8	78/-	7/8	c
20	130/-	11/9	130/-	11/9	c
25	225/-	20/6	225/-	20/6	c
30	275/-	25/-	275/-	25/-	c



FP-280



FP-290

FP-270

FUNNELS, *Pyrex brand* glass, to BS 1923. Length of stem is same as the top diameter of funnel.

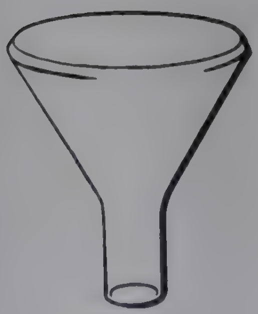
Size	5	6·2	7·5	8·7 cm	
Std. pack qty.	24	24	24	24	
Std. pack	95/-	102/-	111/-	120/-	d
Dozen	49/-	53/-	57/-	62/-	
Each	5/4	5/8	6/-	6/4	

Size	10	15	20 cm	
Std. pack qty.	24	12	6	
Std. pack	133/-	117/-	73/-	d
Dozen	68/-	—	—	
Each	6/10	10/10	13/7	

FP-280

FUNNELS, *Pyrex brand* glass, to BS 1923, precision pressed, with long stem and fluted internally for quick filtering.

Size	6·2	7·5	10 cm	
Std. pack qty.	24	24	24	
Std. pack	111/-	119/-	151/-	d
Dozen	57/-	62/-	78/-	
Each	6/-	6/4	7/6	



FP-300

FP-290

FUNNEL, Willstätter filter, (AG), with glass nail to support filter paper disks of approximately 15 mm diameter. Nominal capacity 5 ml, overall length with nail 100 mm, fitted with 14/15 drip end cone joint, borosilicate glass ... ... Dozen **£6. 0. 0.** Each **£0.11. 0.** a

FP-300

FUNNEL, *Pyrex brand* glass, with short stem for powders. Top diameter, 7·5 cm.
Std. pack of 12 **£3. 6. 0.** Each **£0. 6.10.** d

All items on this page normally available from stock.

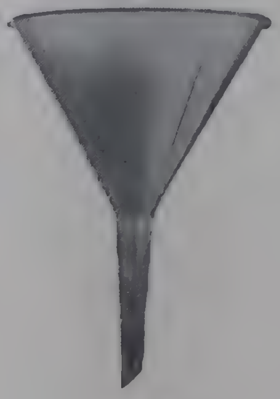
PLASTICS FUNNELS

FP-322

FUNNELS, polypropylene, with external ribs to avoid airlocks.

Diameter	4	6·3	9	11·5 cm	
Dozen	**7/6**	**11/–**	**15/6**	**27/6**	c
Each	**2/6**	**2/7**	**2/11**	**3/10**	

Diameter	14	16·5	19 cm	
Dozen	**36/–**	**44/–**	**66/–**	c
Each	**4/6**	**5/–**	**6/8**	



FP-322

STAINLESS STEEL FUNNELS

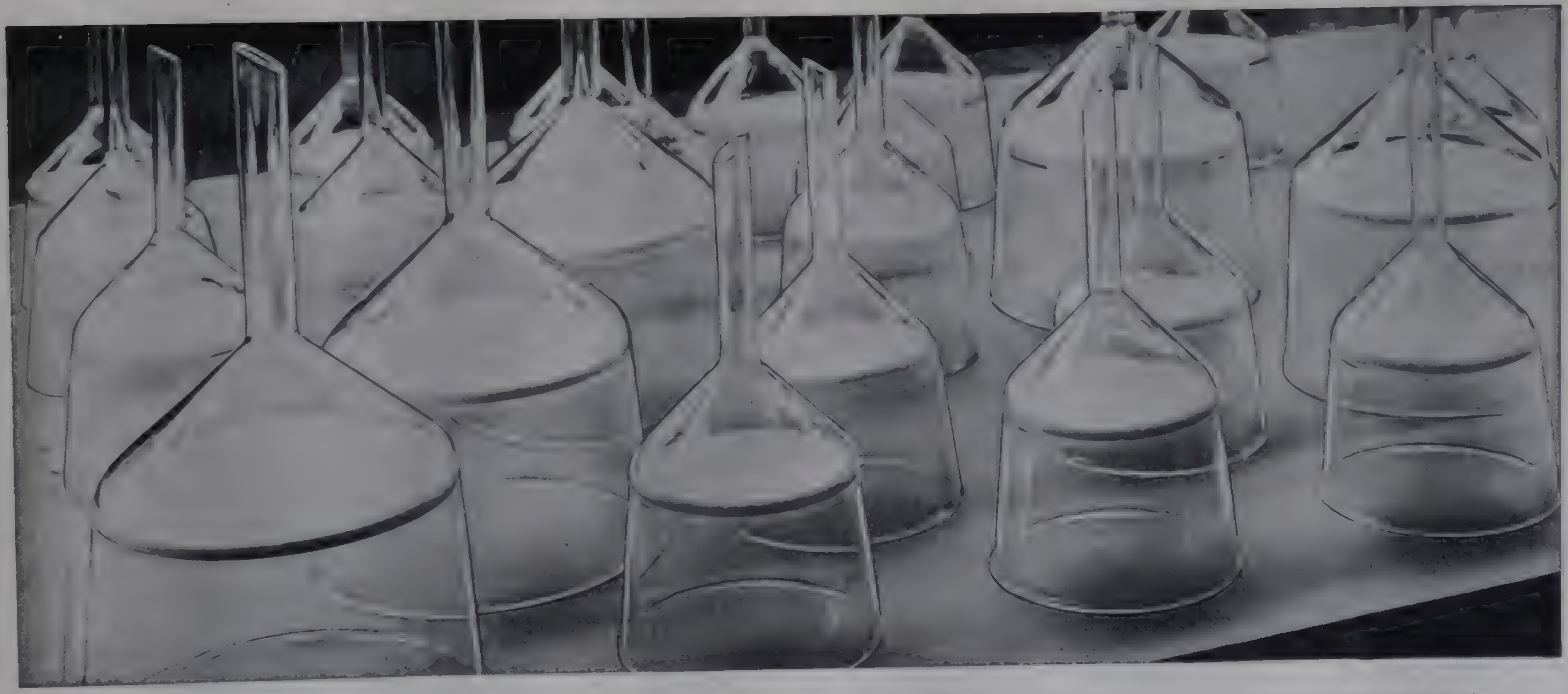
FP-370

FUNNELS, stout welded stainless steel, with handle.

Diameter	160	205	255 mm	
Each	**92/–**	**100/–**	**120/–**	*m*

FP-370

AG FRITTED GLASS FILTER FUNNELS

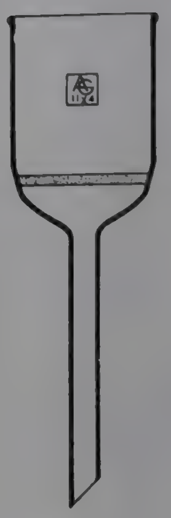


A batch of large Buchner funnels awaiting inspection at our factory where all AG fritted filtration apparatus is manufactured under rigidly controlled conditions.

All items on this page normally available from stock.

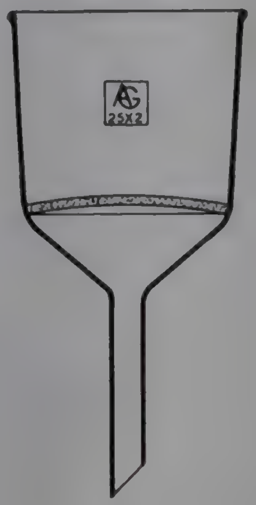
AG FRITTED GLASS FILTER FUNNELS

Regd



3X
11X
11aX

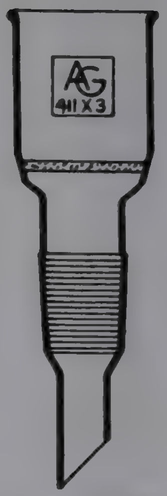
FP-400



17X
25X
26X
27X

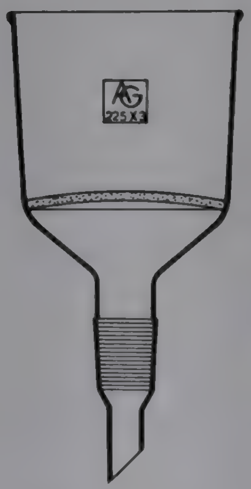
FP-402

RUBBER FLASK ADAPTER suitable for use with these funnels see CW-722 in List No. sequence.



Cone 24/29
411X

FP-410



Cone 29/32	Cone 24/29
217X	417X
225X	425X
226X	426X
227X	427X
FP-414	**FP-416**

All AG fritted (sintered) glass filter funnels are manufactured in our own factory under accurately controlled conditions. Robust construction from stout wall borosilicate glass ensures maximum life. The fritted filter plates are well fired to avoid friability and to maintain porosity within guaranteed limits.

For full details of porosity ranges, cleaning and other useful information see data pages 296/7 on FRITTED FILTRATION APPARATUS.

Always state reference number and porosity required when ordering. The final figure of the ref. No. represents the porosity.

FP-400

FUNNELS, cylindrical, AG, borosilicate glass, with flat fritted glass plate.

Ref. Nos.	3X1 3X2 3X3 3X4	3X5	11X1 11X2 11X3 11X4	11X5	11aX1 11aX2 11aX3 11aX4	
Plate dia.	30	30	40	40	40 mm	
Ht. above plate	45	45	50	50	100 mm	
Capacity, approx.	30	30	60	60	120 ml	
Dozen	**130/-**	**265/-**	**140/-**	**300/-**	**150/-**	*a*
Each	**11/9**	**24/-**	**12/9**	**27/-**	**13/6**	

FP-402

FUNNELS, Buchner, AG, with fritted glass plate.

Ref. Nos.	17X1 17X2 17X3 17X4	17X5	25X0 25X1 25X2 25X3 25X4	26X0 26X1 26X2 26X3 26X4	27X0 27X1 27X2 27X3 27X4	
Plate dia.	65	65	90	120	175 mm	
Ht. above plate	50	50	85	85	110 mm	
Capacity, approx.	140	140	400	700	2500 ml	
Dozen	**255/-**	**420/-**	**340/-**	**510/-**	—	*a*
Each	**23/6**	**38/-**	**31/-**	**46/-**	**118/-**	

FP-410

FUNNELS, cylindrical, AG, borosilicate glass, with flat fritted glass plate and 24/29 cone on the stem. Plate dia. 40 mm, capacity 60 ml approx. Ref. Nos. 411X3, 411X4 ... ... Dozen **£12. 0. 0.** Each **£1. 2. 0.** *a*

FP-414

FUNNELS, Buchner, AG, borosilicate glass, with fritted glass plate and 29/32 cone on the stem.

Ref. Nos.	217X3 217X4	217X5	225X3 225X4	226X3 226X4	227X3 227X4	
Plate dia.	65	65	90	120	175 mm	
Capacity, approx.	140	140	400	700	2500 ml	
Dozen	**400/-**	**590/-**	**510/-**	**700/-**	—	*a*
Each	**36/-**	**53/-**	**46/-**	**64/-**	**135/-**	

When ordering please specify AG fritted filters and state reference No.

All items on this page normally available from stock.

AG
Regd.

FRITTED GLASS FILTER FUNNELS

FP-416

FUNNELS, Buchner, (AG) as FP-414 but with 24/29 cone on the stem.

Ref. Nos.	417X3 417X4	417X5	425X3 425X4	426X3 426X4	427X3 427X4	
Dozen	**400/–**	**590/–**	**510/–**	**700/–**	—	*a*
Each	**36/–**	**53/–**	**46/–**	**64/–**	**135/–**	

FP-420

FUNNELS, cylindrical, (AG) borosilicate glass, with flat fritted glass plate, 24/29 cone on the stem and side tube for pump connection. These funnels may be fitted direct to round bottom flasks or bottles with 24/29 sockets. Plate dia. 40 mm, capacity 60 ml, approx. Ref. Nos. 511X3, 511X4. Dozen **£15. 10. 0.** Each **£1. 8. 0.** *a*

FP-424

FUNNELS, Buchner, (AG) borosilicate glass, with fritted glass plate, 29/32 cone on the stem and side tube for pump connection. May be used in the same way as FP-420.

Ref. Nos.	317X3 317X4	317X5	325X3 325X4	
Plate dia.	65	65	90 mm	
Capacity, approx.	140	140	400 ml	
Dozen	**430/–**	**620/–**	**590/–**	*a*
Each	**39/–**	**56/–**	**53/–**	

FP-426

FUNNELS, Buchner, (AG) as FP-424 but with 24/29 cone on the stem.

Ref. Nos.	517X3 517X4	517X5	525X3 525X4	
Dozen	**430/–**	**620/–**	**590/–**	*a*
Each	**39/–**	**56/–**	**53/–**	

FP-440

FUNNELS, Hirsch, (AG) borosilicate glass, with fritted glass plate.

Ref. Nos.	39X3 39X4	54X3 54X4	
Plate dia.	20	30 mm	
Ht. above plate	20	35 mm	
Top dia.	55	80 mm	
Capacity, approx.	25	60 ml	
Dozen	**130/–**	**150/–**	*a*
Each	**11/9**	**13/6**	

FP-445

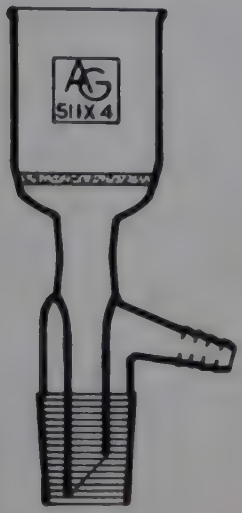
FUNNELS, Hirsch, (AG) borosilicate glass, with fritted glass plate of 20 mm diameter and 19/26 cone on the stem. For use in semi-micro preparative work. Capacity 20 ml approx. Ref. Nos. 239X3, 239X4.
Dozen **£12. 0. 0.** Each **£1. 2. 0.** *a*

TF-410

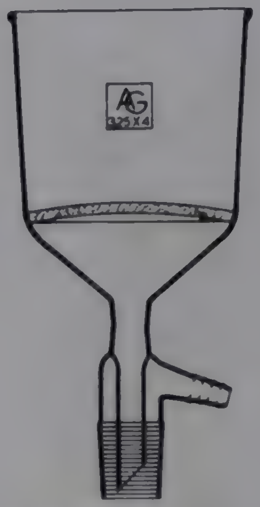
TEST TUBE, with 19/26 socket and sidearm, see entry in List No. sequence.

FD-670

FUNNEL, Hirsch semi-micro, (AG) with 10 mm fritted glass plate and 14/15 cone on stem. For price see entry in List No. sequence.

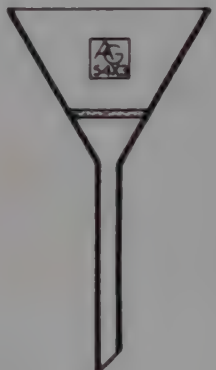


Cone 24/29
511X
FP-420

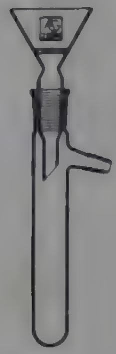


Cone 29/32
317X
325X
FP-424

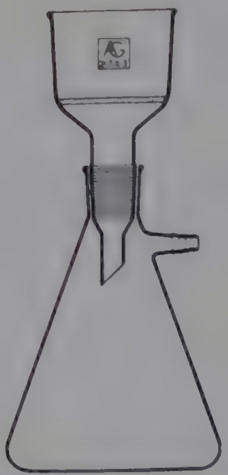
Cone 24/29
517X
525X
FP-426

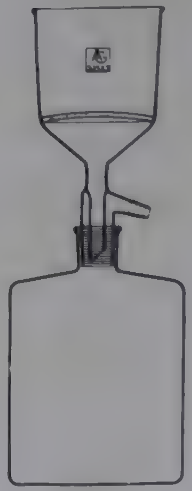


39X
54X
FP-440



239X
FP-445
with **TF-410**





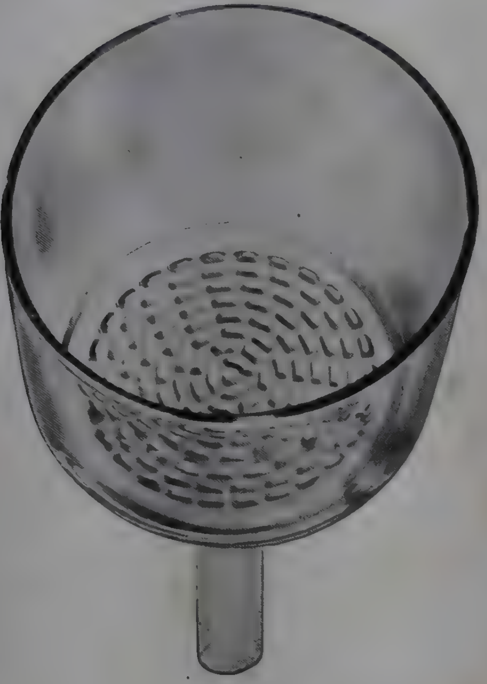
Joint	**24/29**	**29/32**	**Joint**	**24/29**	**29/32**
Funnel	**FP-416**	**FP-414**	**Funnel**	**FP-426**	**FP-424**
Flask	**Q-FB IL/3**	**FJ-290**	**Bottle**	**BW-655**	**BW-655**

Specimen (AG) fritted filtration assemblies.

All items on this page normally available from stock.

BUCHNER FUNNELS

FP-460
FUNNEL, slit sieve Buchner, *Pyrex brand* glass. With glass disk, of 6 cm diameter, sealed-in above the stem.
Std. pack of 4 **£3. 14. 0.** Each **£1. 0. 9.** *d*


FP-460

FP-470
FUNNELS, Buchner, rigid polythene, made in two pieces to allow ease of cleaning.

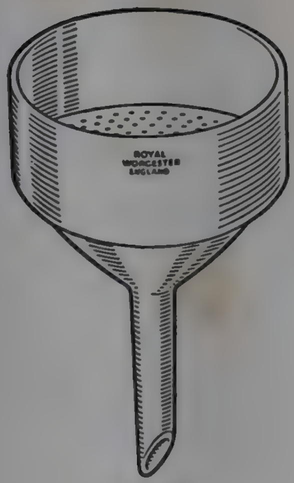
Paper diameter	11	15 cm	
Depth	7·5	8·5 cm	
Each	**34/–**	**49/–**	*m*

FP-470
(shown in two pieces)

FP-495
FUNNELS, Buchner, *Royal Worcester* porcelain, with perforated plate.

Ext. dia.	65	82	105	125 mm	
For papers dia.	55	70	90	110 mm	
Each	**11/–**	**14/6**	**20/–**	**26/–**	*d*

Ext. dia.	168	220	275 mm	
For papers dia.	150	185	240 mm	
Each	**56/–**	**70/–**	**148/–**	*d*



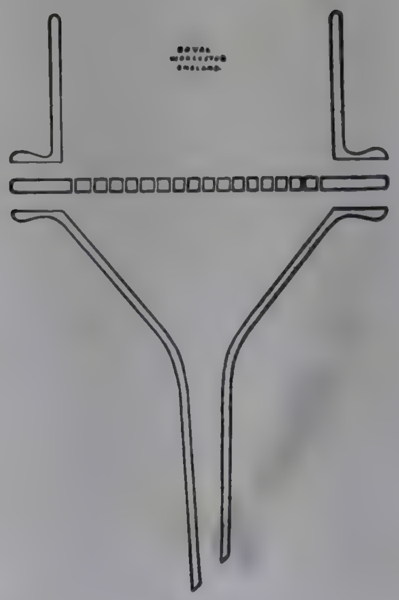
FP-495

FP-510
FUNNELS, Buchner, Hartley 3-section pattern, *Royal Worcester* porcelain. Size of suitable filter paper same as relevant disk diameter.

Size No.	2	3	4	5	6	
Disk dia.	90	110	125	150	185 mm	
Each	**27/9**	**38/9**	**45/–**	**58/6**	**70/–**	*d*

REPLACEMENT PARTS

List No.	Size No.		2	3	4	5	6	
FP-512	Disk, perforated	Each	**5/6**	**6/9**	**7/9**	**9/6**	**13/3**	*d*
FP-514	Top section	Each	**7/9**	**12/3**	**13/3**	**18/6**	**24/3**	*d*
FP-516	Bottom section	Each	**10/6**	**15/9**	**20/–**	**26/6**	**28/6**	*d*
FP-518	Set of three clips	Set	**4/–**	**4/–**	**4/–**	**4/–**	**4/–**	*d*



FP-510

BUCHNER TYPE FILTERS in polypropylene, chemical porcelain and stainless steel see also pages 279, 280.

All items on this page normally available from stock.

SEPARATING FUNNELS
SPHERICAL OR PEAR SHAPE

FP-541

FUNNELS, spherical separating, (AG) to BS 2021 Type 1A with interchangeable polypropylene stopper, borosilicate glass.

Capacity	50	100	250	500	1000 ml	
Joint size	19/17	19/17	24/20	24/20	29/22	
Dozen	**160/–**	**175/–**	**215/–**	**275/–**	**360/–**	*a*
Each	**14/6**	**16/–**	**19/6**	**25/–**	**33/–**	

FP-543

FUNNELS, spherical separating, (AG) as FP-541 but fitted with **interchangeable stopcock,** borosilicate glass.

Capacity	50	100	250	500	1000 ml	
Dozen	**220/–**	**235/–**	**280/–**	**340/–**	**420/–**	*a*
Each	**20/–**	**21/6**	**25/6**	**31/–**	**38/–**	

ACCESSORIES

SU-520 **STOPPERS,** hollow blown glass, suitable for use in above separating funnels. For prices see entry in List No. sequence.

FP-545

FUNNELS, spherical separating, to BS 2021, *Pyrex brand* glass with interchangeable glass stopper.

Capacity	50	100	250	500 ml	
Joint size	19/26	19/26	24/29	24/29	
Std. pack qty.	6	6	6	6	
Std. pack	**156/–**	**159/–**	**172/–**	**175/–**	*d*
Each	**28/11**	**29/6**	**31/10**	**32/6**	

Capacity	1000	2000	5000 ml	
Joint size	29/32	34/35	34/35	
Std. pack qty.	4	2	2	
Std. pack	**135/–**	**86/–**	**140/–**	*d*
Each	**37/7**	**48/2**	**78/–**	

SEPARATING FUNNELS
CONICAL SHAPE

FP-551

FUNNELS, conical separating, (AG) to BS 2021 Type 2A with interchangeable polypropylene stopper, borosilicate glass.

Capacity	50	100	250	500	1000 ml	
Joint size	19/17	19/17	24/20	24/20	29/22	
Dozen	**205/–**	**215/–**	**275/–**	**340/–**	**440/–**	*a*
Each	**18/6**	**19/6**	**25/–**	**31/–**	**40/–**	

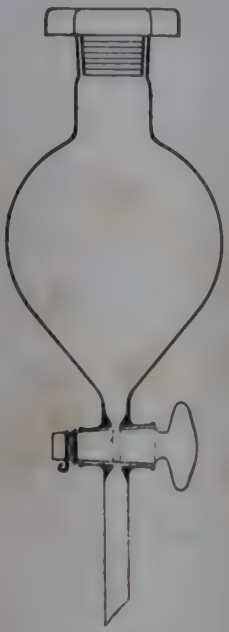
FP-553

FUNNELS, conical separating, (AG) as FP-551 but fitted with **interchangeable stopcock,** borosilicate glass.

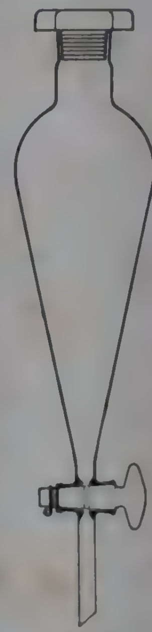
Capacity	50	100	250	500	1000 ml	
Dozen	**270/–**	**285/–**	**350/–**	—	—	*a*
Each	**24/6**	**26/–**	**32/–**	**37/–**	**47/–**	

ACCESSORIES

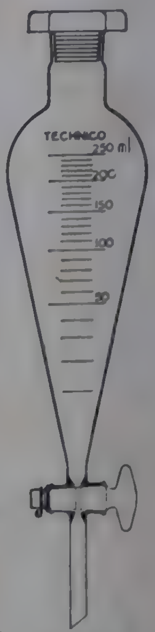
SU-520 **STOPPERS,** hollow blown glass, suitable for use in above separating funnels. For prices see entry in List No. sequence.



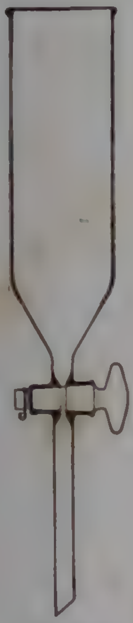
FP-541
FP-543



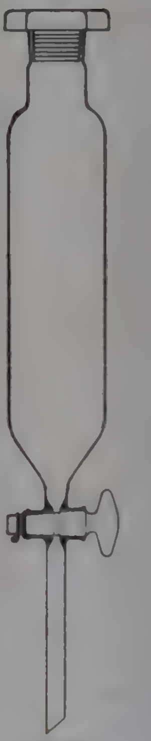
FP-551
FP-553



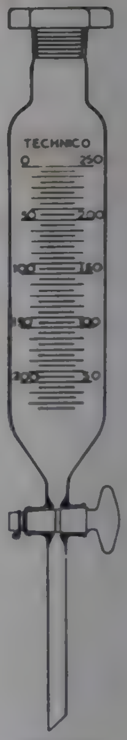
FP-554



FP-570



FP-581
FP-583



FP-584

FP-554

FUNNELS, conical separating, *Technico* as FP-551 but graduated.

Capacity	100	250 ml	
Dozen	**440/–**	**460/–**	*a*
Each	**40/–**	**42/–**	

FP-557

FUNNELS, conical separating, to BS 2021, *Pyrex brand* glass with interchangeable glass stopper.

Capacity	100	250	500	1000	2000 ml	
Joint size	19/26	24/29	24/29	29/32	34/35	
Std. pack qty.	6	6	6	4	2	
Std. pack	**140/–**	**156/–**	**166/–**	**121/–**	**83/–**	*d*
Each	**26/–**	**28/11**	**30/10**	**33/9**	**46/2**	

All items on this page normally available from stock.

DROPPING FUNNELS

CYLINDRICAL SHAPE

See illustrations on previous page.

FP-570

FUNNELS, cylindrical dropping, open top, (AG) to BS 2021, borosilicate glass.

Capacity	25	50	100	250 ml	
Dozen	**130/–**	**140/–**	**150/–**	**205/–**	*a*
Each	**11/9**	**12/9**	**13/6**	**18/6**	

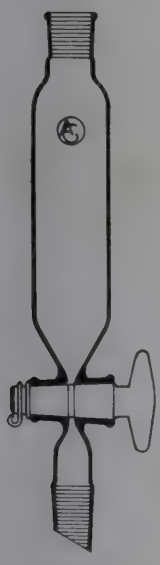
NR-220

FUNNEL, cylindrical dropping, with long offset delivery stem, see entry in List No. sequence.

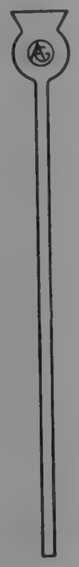
FP-581

FUNNELS, cylindrical dropping, (AG) to BS 2021 with interchangeable polypropylene stopper, borosilicate glass.

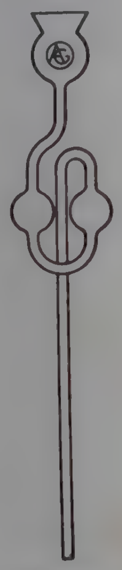
Capacity	25	50	100	250	500	1000 ml	
Joint size	14/15	19/17	19/17	24/20	24/20	29/22	
Dozen	**165/–**	**175/–**	**185/–**	**215/–**	**275/–**	**370/–**	*a*
Each	**15/–**	**16/–**	**17/–**	**19/6**	**25/–**	**34/–**	



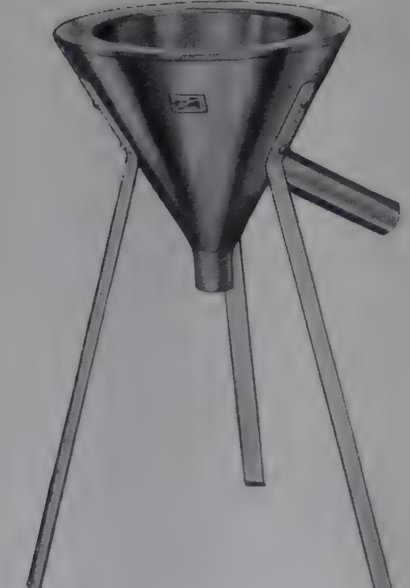
FP-587



FP-650



FP-660



FP-710

FP-720 with 15 cm glass funnel

FP-583

FUNNELS, cylindrical dropping, (AG) as FP-581 but fitted with **interchangeable stopcock,** borosilicate glass.

Capacity	25	50	100	250	500	1000 ml	
Dozen	**225/–**	**235/–**	**245/–**	**280/–**	**350/–**	**450/–**	*a*
Each	**20/6**	**21/6**	**22/6**	**25/6**	**32/–**	**41/–**	

FP-584

FUNNELS, cylindrical dropping, *Technico,* as FP-581 but **graduated.**

Capacity	50	100	250	500	1000 ml	
Dozen	**265/–**	**280/–**	**370/–**	**440/–**	**530/–**	*a*
Each	**24/–**	**25/6**	**34/–**	**40/–**	**48/–**	

FP-587

FUNNEL, cylindrical dropping, (AG) with 14/15 socket and 14/15 drip end cone. Nominal capacity 30 ml, overall length 21 cm, borosilicate glass. Without stopper.
Dozen **£10. 0. 0.** Each **£0. 18. 0.** *a*

ACCESSORIES

SU-520 **STOPPERS,** hollow blown glass, suitable for use in above separating funnels. For prices see entry in List No. sequence.

FP-590

FUNNELS, cylindrical dropping, to BS 2021, *Pyrex brand* glass with interchangeable glass stopper.

Capacity	25	50	100	250	500	1000 ml	
Joint size	14/23	19/26	19/26	24/29	24/29	29/32	
Std. pack qty.	6	6	6	4	4	2	
Std. pack	**128/–**	**139/–**	**148/–**	**118/–**	**158/–**	**93/–**	*d*
Each	**23/10**	**25/10**	**27/5**	**32/10**	**43/10**	**52/–**	

THISTLE FUNNELS

FP-650

FUNNEL, thistle, (AG) soda glass, with straight stem. Overall length 30 cm.
Dozen **£1. 2. 0.** Each **£0. 3. 5.** *a*

FP-660

FUNNEL, thistle, (AG) as FP-650 but with bend and two bulbs. Overall length, 30 cm.
Dozen **£3. 6. 0.** Each **£0. 6. 8.** *a*

FUNNEL HEATERS

FP-710

FUNNEL HEATER, Hot Water, double wall copper supported on three legs. To take, but not supplied with, 15 cm diameter glass funnel ... ... Each **£5. 16. 0.** *c*

FP-720

FUNNEL HEATER, Steam, constructed from lead tubing. To take, but not supplied with, 15 cm diameter glass funnel ... ... Each **£5. 0. 0.** *c*

FUNNEL heaters, *Electrothermal* see HEATING MANTLES
holders } see STANDS & CLAMPS
stands }
FUNNELS, weighing see WEIGHING ACCESSORIES

All items on this page normally available from stock.

Gallenkamp LABORATORY FURNACES

All *Gallenkamp* furnaces are made to conform in detail with the relevant specifications of the British Standards Institution and the Institute of Electrical Engineers and are tested using methods recommended in the British Standard.

The wide range of furnaces which we offer includes types to suit practically all laboratory applications. The outstanding performance and reliability of each furnace results directly from our design and production experience accumulated since 1914 when we started manufacturing and our use of sound modern methods and materials.

- Furnaces are designed for safe and reliable continuous running at the published maximum temperature.
- Furnaces are, whenever practicable, self contained with all controls and accessories necessary for efficient operation built into non-corroding asbestolite cases.
- Automatic control is either standard or available as an alternative to manual control.
- Temperature fuses and other safety devices are fitted to prevent damage by accidental overheating.

When standard furnaces from the range are unsuitable for work of a specialised character we are always pleased to study the customer's requirements and frequently can offer a purpose built furnace. Please ask for our purpose built furnace questionnaire.

GENERAL PURPOSE STANDARD FURNACES

List No.	Description	Maximum temperature	Internal dimensions	Controls	Page
FR-520	Muffle furnace, wire wound	1100°C	4 × 5 × 6 in	Manual	307
FR-550/574	Muffle furnaces, wire wound	1100°C	3¼ × 6 × 9¼ in 5¼ × 7½ × 15 in 8 × 9 × 18 in	Manual or automatic	308
FR-655/657	Box furnace, wire wound	1250°C	6 × 6 × 12 in	Automatic	310
FR-720/721	Box furnace, silicon carbide elements	1400°C	4 × 5 × 7 in	Manual	311
FR-740/741	Box furnaces, silicon carbide elements	1400°C	4 × 6 × 12 in 6 × 9 × 15 in	Automatic	312
FR-770	Box furnace, molybdenum disilicide elements	1500°C	7 × 7 × 12½ in	Automatic	313
FS-470	Crucible furnaces, wire wound	1000°C	9 × 4 in 15 × 6 in	Manual	319
FS-212/215	Single tube furnaces, wire wound	1200°C	12 × 1½ in; 16 × 2 in	Manual	314
FS-232/235	Twin tube furnaces wire wound	1200°C	12 × 1½ in; 16 × 2 in	Manual	315
FS-300/325	Single tube furnace, silicon carbide elements	1400°C	6 × $1\tfrac{3}{16}$ in	Manual	316
FS-350/351	Twin tube furnace, silicon carbide elements	1400°C	7 × 1¼ in	Manual	317
FS-400	Tube furnaces, molybdenum disilicide elements	1500°C	10½ × 1½ in 12½ × 3¼ in	Automatic	318

SPECIAL PURPOSE STANDARD FURNACES

List No.	Description	Maximum temperature	Purpose	Page
FS-530	Ash furnaces, low and high temperature	500°C	Coal and coke testing	320
FS-540	,, ,, ,, ,, ,, ,,	815°C	,, ,, ,, ,,	,,
FS-560	Volatile matter furnace	900°C	Coal and coke testing	321
FS-700/750	Tube furnaces	1100°C and 1200°C	Differential thermal analysis of minerals	322 to 324
FS-900	Carius furnace	300°C	Determinations of sulphur and halogens	325

Gallenkamp LABORATORY FURNACES

TECHNICAL INFORMATION

HEATING ELEMENTS

Wound wire heating elements

Wire-wound muffle and tube furnaces and box furnaces with internal spiralled wire elements, utilise resistance wires of the highest quality. Suitable materials for these wires were selected only after extensive life tests and many years of experience have confirmed the designs of the elements.

Silicon carbide heating elements

Silicon carbide elements are capable of attaining high temperatures without the need for a protective atmosphere. They are made in the form of a tube of uniform diameter, the centre having a helical slot to form a higher resistance heating zone.

The increase of electrical resistance at 1400 to 1450°C is about 15 to 20% in 1000 hours. This low ageing rate together with very efficient furnace design means that we are able to specify operating temperatures of 1400°C and be certain that users will find the furnace reliable and economical to run. All designs permit quick and easy replacement of elements when necessary.

The furnaces are offered with built-in **element economiser transformers** which can be adjusted to increase the voltage on the heating elements as they age. For an initial extra cost less than that of a set of replacement elements, the useful life of each set of elements may be increased by as much as 100%.

Molybdenum disilicide heating elements

These elements are of molybdenum disilicide, modified by the addition of metallic and ceramic materials to provide a highly refractory material ideally suited for furnace heating elements. They can be heated to 1600°C in air for extended periods without any increase in electrical resistance. This high operating temperature enables furnaces to be constructed having a good heating rate up to 1500°C and capable of continuous operation at 1500°C without element deterioration. Molybdenum disilicide elements are unsuitable for routine operation below 1000°C. High temperature box and tube furnaces fitted with molybdenum disilicide elements have established an excellent reputation for reliability.

Owing to the low resistivity of molybdenum disilicide and to the fact that heating elements of this material are manufactured with a relatively large cross-section, these elements must be operated on low voltage/high current supplies from tapped transformers. These are supplied as standard equipment with all *Gallenkamp* molybdenum disilicide element furnaces.

CONSTRUCTION

All furnace outer cases are constructed from non-corroding asbestolite panels with smooth surfaces. Highest grade refractory and insulating materials are used throughout. Doors are light alloy castings, efficiently insulated and accurately counterpoised or mounted for easy movement between stable open and closed positions. The refractory linings of doors on larger furnaces never radiate towards the operator. They are prevented from doing so by the positions and designs of the suspension systems. Exterior fittings such as hearth-shelves are strong alloy castings. On furnaces operating up to 1100°C, thermocouples are chromel-alumel and for higher temperatures they are platinum: 13% rhodium platinum. The pyrometer indicators have robust moving coil movements. Automatic controllers, whether ON/OFF or proportional have jewelled bearing meter movements and electronic amplifiers to maintain the preset temperature with precision.

All electrical terminations are enclosed by the outer covers to afford complete electrical and mechanical protection.

TEMPERATURE CONTROL

With few exceptions three alternative types of temperature control circuits are offered for the standard range of furnaces. To ensure that control methods, circuits and safety equipment on furnaces are the most modern and satisfactory at reasonable cost, regular exhaustive tests are made on new equipment which becomes available.

1. Manual control (by energy regulator).

This is the least expensive method of control, and although very simple, it provides a remarkable performance over long periods. For example the total temperature drift can be as small as ±5°C over 24 hours. An energy regulator compensates for fluctuations in mains voltage, and is quite adequate for most laboratory applications. The operating setting is found by trial and error, and temperature stabilisation and recovery are slow (unless the regulator is adjusted) and a temperature drift results from significant changes in ambient temperature.

2. Automatic ON/OFF control (by energy regulator and ON/OFF controller).

Using this type of control, the disadvantages of manual control are largely overcome. The working temperature rises rapidly to the value set on the calibrated scale, recovery after loading the furnace is brisk and accurate, and the effects of ambient temperature changes are negligible. Temperature fluctuations due to the cycling of the controller are minimised by use of the energy regulator.

These considerations, and the ease with which the temperature may be set, frequently justify the additional cost of automatic on/off control.

See **Note** below.

3. Automatic proportional control (by energy regulator and proportional controller).

This type of control is the most accurate standard form of control fitted to *Gallenkamp* furnaces.

The pointer has merely to be set on the scale, and the controller takes over completely. As with the simpler on/off control, the furnace recovers briskly and is independent of ambient temperature and supply voltage fluctuations. With automatic proportional control, however, the mean energy input is gradually reduced as the required temperature is approached, thus eliminating temperature overshoot and fluctuations. It is strongly recommended wherever stringent temperature control is essential. The energy regulator is retained to permit control of heating and cooling rates when this also is desirable.

NOTE: All automatic controllers fail safe and have thermocouple breakage protection devices to switch off the furnace in the event of a break in the thermocouple circuit.

Gallenkamp 'HOTSPOT' MUFFLE FURNACE, 1000°C or 1100°C

WOUND WIRE HEATING ELEMENTS
MANUAL CONTROL

A compact and inexpensive bench furnace for general laboratory purposes.

- **Heating to 1000°C in under one hour**
- **Fluctuation less than 3°C**
- **Built-in cold junction temperature auto-compensation**
- **Cast muffle provides smooth interior**

An element protection fuse which operates at 1000°C is fitted to every furnace. **For working up to 1100°C this must be replaced by the accessory fuse FR-534.**

DIMENSIONS

	H W D
Internal	10 × 12·5 × 15 cm
	4 × 5 × 6 in
Overall	39 × 35 × 30 cm
	15½ × 14 × 12 in
Base	30·5 × 24·5 cm
	12¼ × 9¾ in
Weight, net	23 kg (50 lb)
Maximum power rating	1500W

Additional technical information refer to page 306.

FR-520

MUFFLE FURNACE, 'HOTSPOT', *Gallenkamp*, **manual control, for 1000°C** with energy regulator, 5·7 cm scale indicating pyrometer and element protection fuse. For single phase a.c. supplies.

For 220/240V	Each	**£60. 0. 0.**	*b*
For 200/210V	Each	**£60. 0. 0.**	*bN*
For 110/120V	Each	**£62. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

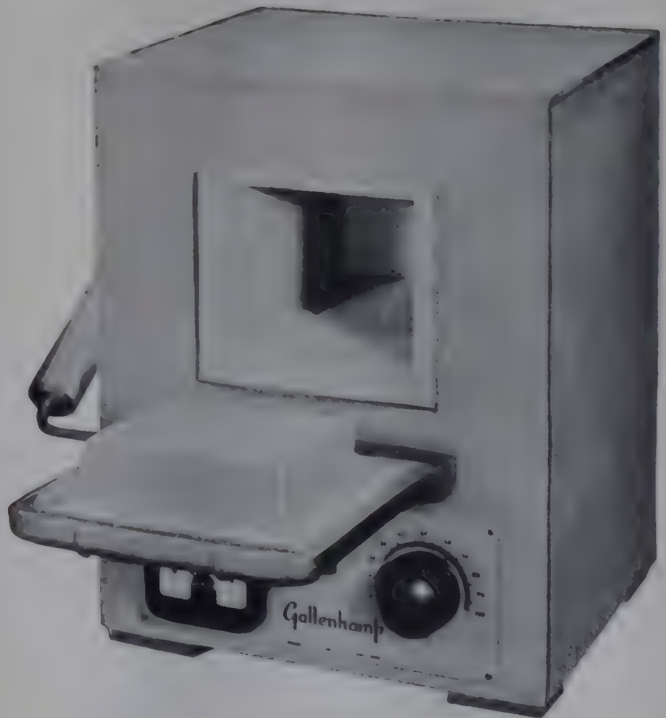
FR-522	**Wound muffle**	Each	**£5. 10. 0.**	*b*
FR-526	**Temperature fuse,** for 1000°C working.	Pack of 5	**£0. 14. 6.**	*b*
FR-530	**Twin-bore sleeve,** for temperature fuse.	Pack of 5	**£1. 1. 6.**	*b*
FR-531	**Outer protecting sheath** for temperature fuse.	Pack of 3	**£1. 6. 0.**	*b*
FR-532	**Thermocouple element,** with insulators.	Each	**£0. 15. 0.**	*b*

ACCESSORY

FR-534	**Temperature fuse,** or 1100°C working.	Each	**£2. 8. 0.**	*m*

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

FR-520

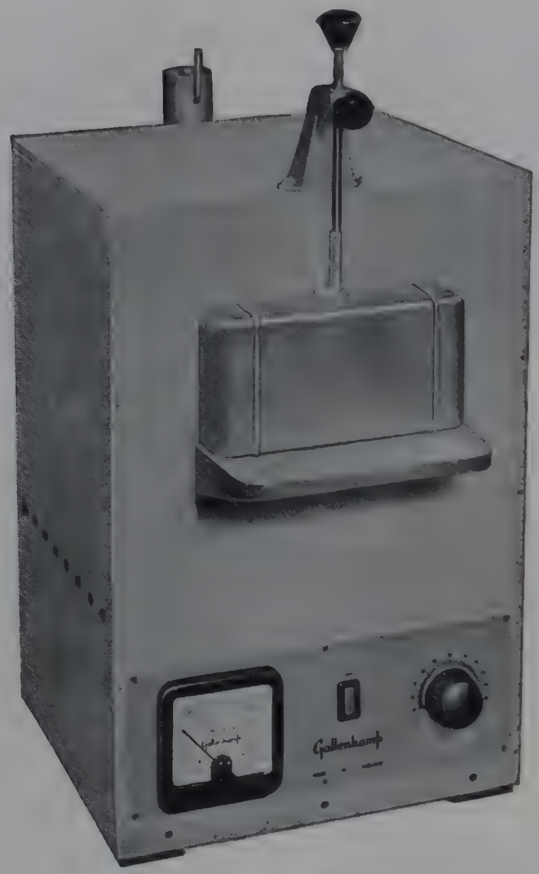


FR-520 showing door open

For suitable **FLOOR STANDS**—see pages 326/7.

Items on this page normally available from stock except those coded *N*.

Gallenkamp GENERAL PURPOSE



FR-550

A range of muffle furnaces in three sizes with three alternative forms of control suitable for laboratory or tool room use. These furnaces may be operated continuously at 1000°C or intermittently up to 1100°C.

- **Heating to 1000°C in 1¼ hours**
- **±4°C control with ON/OFF controller**
- **±1°C control with proportional controller**
- **Draught control chimneys fitted at rear**

Fuses

To avoid damage by overheating to the heater windings or workpieces, every furnace is fitted with a 1000°C fuse. For operation to 1100°C this must be replaced with the interchangeable accessory fuse FR-586, which is supplied with every furnace.

Doors

All three sizes are offered with swing-up doors and the two smaller sizes can be supplied with the alternative slide-and-lock doors which are recommended if the furnaces are to be used for ashing or similar work requiring large airflows. All doors open with hot surfaces away from the operator.

Additional technical information refer to page 306.

FURNACES WITH SLIDE-AND-LOCK DOORS

FR-550

MUFFLE FURNACES, *Gallenkamp*, **manual control, for 1000°C/1100°C,** with slide-and-lock door, 9 cm scale pyrometer indicator, power relay and element protection fuses. For single phase a.c. supplies.

Size No.		1	2	
For 220/240V	Each	**£89. 0. 0.**	**£103. 0. 0.**	*b*
For 200/210V	Each	**£89. 0. 0.**	**£103. 0. 0.**	*bN*
For 110/120V	Each	**£89. 0. 0.**	**£103. 0. 0.**	*bN*

FR-552

MUFFLE FURNACES, *Gallenkamp*, **automatic ON/OFF control, for 1000°C/1100°C,** with slide-and-lock door, 20 cm scale controller, energy regulator, power relay and element protection fuses. For single phase a.c. supplies.

Size No.		1	2	
For 220/240V	Each	**£134. 10. 0.**	**£149. 0. 0.**	*g*
For 200/210V	Each	**£134. 10. 0.**	**£149. 0. 0.**	*gN*
For 110/120V	Each	**£134. 10. 0.**	**£149. 0. 0.**	*gN*

FR-572

FR-554

MUFFLE FURNACES, *Gallenkamp*, **automatic proportional control, for 1000°C/1100°C,** with slide-and-lock door, 20 cm scale controller, energy regulator, power relay and element protection fuses. For single phase a.c. supplies.

Size No.		1	2	
For 220/240V	Each	**£151. 0. 0.**	**£165. 0. 0.**	*g*
For 200/210V	Each	**£151. 0. 0.**	**£165. 0. 0.**	*gN*
For 110/120V	Each	**£151. 0. 0.**	**£165. 0. 0.**	*gN*

When ordering please state voltage and nature of supply.

Items on this page normally available from stock except those coded *N*.

MUFFLE FURNACES, 1000°C/1100°C

WOUND WIRE HEATING ELEMENTS
MANUAL OR AUTOMATIC CONTROL

DIMENSIONS

Size No.	1			2			3			
	H	W	D	H	W	D	H	W	D	
Internal	8·3 ×	15 ×	23·5	13·5 ×	19 ×	38	20 ×	23 ×	46	cm
	3¼ ×	6 ×	9¼	5¼ ×	7¼ ×	15	8 ×	9 ×	18	in
Overall	76 ×	51 ×	50	84 ×	51 ×	67	100 ×	65 ×	79	cm
	30 ×	20 ×	19¾	33 ×	20 ×	26½	39 ×	25½ ×	31	in
Base		44·5 ×	33·5		44·5 ×	49		48·5 ×	57·5	cm
		17½ ×	13¼		17½ ×	19¼		19 ×	22½	in
Weight, net		50			80			125		kg
		110			175			275		lb
Maximum power rating		2			3·5			5		kW

For suitable FLOOR STANDS—see pages 326/7.

For suitable TRAYS—see TU-540 in List No. sequence.

FURNACES WITH SWING-UP DOORS

FR-570

MUFFLE FURNACES, *Gallenkamp*, **manual control, for 1000°C/1100°C,** with swing-up door, 9 cm scale pyrometer indicator, power relay and element protection fuses. For single phase a.c. supplies.

Size No.	1	2	3	
For 220/240V	£93. 10. 0.	£107. 0. 0.	£156. 10. 0.	*b*
For 200/210V	£93. 10. 0.	£107. 0. 0.	£156. 10. 0.	*bN*
For 110/120V	£93. 10. 0.	£107. 0. 0.	£156. 10. 0.	*bN*

All prices each

FR-572

MUFFLE FURNACES, *Gallenkamp*, **automatic ON/OFF control, for 1000°C/1100°C,** with swing-up door, 20 cm scale controller, energy regulator, power relay and element protection fuses. For single phase a.c. supplies.

Size No.	1	2	3	
For 220/240V	£135. 0. 0.	£149. 0. 0.	£195. 0. 0.	*g*
For 200/210V	£135. 0. 0.	£149. 0. 0.	£195. 0. 0.	*gN*
For 110/120V	£135. 0. 0.	£149. 0. 0.	£195. 0. 0.	*gN*

All prices each

FR-574

MUFFLE FURNACES, *Gallenkamp*, **automatic proportional control, for 1000°C/1100°C,** with swing-up door, 20 cm scale controller, energy regulator, power relay and element protection fuses. For single phase a.c. supplies.

Size No.	1	2	3	
For 220/240V	£156. 0. 0.	£170. 0. 0.	£209. 0. 0.	*g*
For 200/210V	£156. 0. 0.	£170. 0. 0.	£209. 0. 0.	*gN*
For 110/120V	£156. 0. 0.	£170. 0. 0.	£209. 0. 0.	*gN*

All prices each

When ordering please state voltage and nature of supply.

FR-572 with FS-922

REPLACEMENT PARTS

FR-580 **Wound muffles.**

Size No.	1	2	3	
Each	140/–	280/–	410/–	*b*

FR-526	**Temperature fuse,** 1000°C working. For price see entry in List No. sequence.			
FR-586	**Temperature fuse,** 1100°C working.	Each	£1. 0. 0.	*m*
FR-530	**Twin-bore sleeve,** for temperature fuse in furnace, size No. 1. For price see entry in List No. sequence.			
FR-588	**Twin-bore sleeve,** for temperature fuse in furnaces, sizes Nos. 2 and 3	Pack of 5	£1. 15. 0.	
FR-531	**Outer protecting sheath,** for temperature fuse. For price see entry in List No. sequence.			
FR-590	**Thermocouple element,** with insulators.	Each	£0. 16. 0.	*b*
FR-592	**Amplifier valve,** *Brimar* Type 6158.	Each	£1. 5. 0.	*m*
FR-594	**Indicator lamp bulb.**	Each	£0. 2. 6.	*m*

Items on this page normally available from stock except those coded *N*.

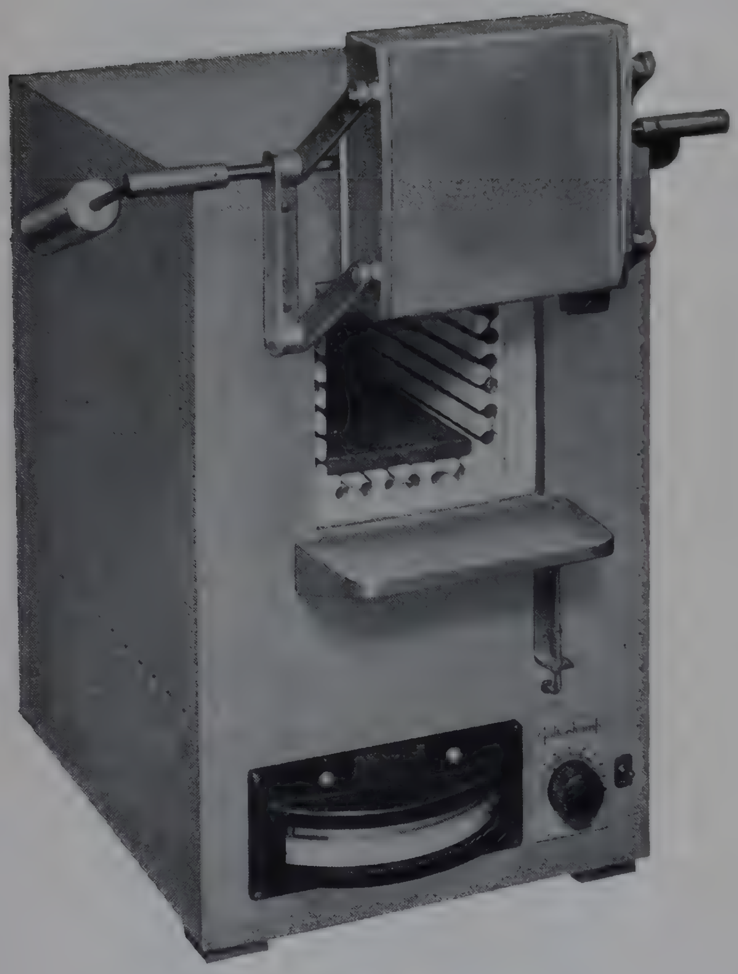
Gallenkamp GENERAL PURPOSE BOX FURNACES, 1250°C

WOUND WIRE HEATING ELEMENTS
AUTOMATIC CONTROL

Suitable for general applications in laboratories or tool rooms and for small scale ceramic firings.

- **Heating to 1250°C in 2¼ hours**
- **Positively counterpoised doors**

Because the elements are exposed to the furnace interior, a micro-switch operates to cut their power supply as the door is opened. To prevent overheating, a 1250°C temperature fuse is fitted.



FR-655

DIMENSIONS

	H	W	D
Internal	15 ×	15 ×	30 cm
	6 ×	6 ×	12 in
Overall	100 ×	64 ×	66 cm
	39 ×	25 ×	26 in
Base		46 ×	55 cm
		18 ×	21½ in
Weight, net	140 kg		
	310 lb		
Maximum power rating	5 kW		

Additional technical information refer to page 306.

FR-655

BOX FURNACE, *Gallenkamp*, **automatic ON/OFF control, for 1250°C,** with 20 cm scale controller, energy regulator, element protection fuse and safety door switch. For single phase a.c. supplies.

For 200/250V	Each	**£245**. 0. 0.	*g*
For 110/120V	Each	**£248**. 0. 0.	*gN*

FR-657

BOX FURNACE, *Gallenkamp*, **automatic proportional control, for 1250°C,** with 20 cm scale controller, energy regulator, element protection fuse and safety door switch. For single phase a.c. supplies.

For 200/250V	Each	**£260**. 0. 0.	*g*
For 110/120V	Each	**£263**. 0. 0.	*gN*

When ordering please state voltage and nature of supply

REPLACEMENT PARTS

FR-660	**Heater spirals,** twelve are required for the furnace. Dozen £33. 0. 0.	Each	£3. 0. 0.	*b*
FR-664	**Hearth plate**	Each	£1. 8. 6.	*m*
FR-670	**Temperature fuse,** 1250°C working.	Each	£1. 15. 0.	*m*
FR-672	**Twin bore sleeve,** for temperature fuse.	Pack of 5	£0. 13. 0.	*b*
FR-674	**Outer protecting sheath,** for temperature fuse or thermocouple	Each	£1. 3. 0.	*b*
FR-676	**Thermocouple element,** with insulators.	Each	£10. 5. 0.	*m*
FR-592	**Amplifier valve,** *Brimar* Type 6158	For prices see entries in List No. sequence.		
FR-594	**Indicator lamp bulb** ...			

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

For suitable **FLOOR STANDS**—see pages 326/7.

Items on this page normally available from stock except those coded *N*.

Gallenkamp SMALL BOX FURNACES 1400°C

SILICON CARBIDE HEATING ELEMENTS
MANUAL CONTROL

Reliable furnaces for general laboratory work at temperatures up to 1400°C.

- **Heating to 1400°C in 2¼ hours**
- **Reliable continuous operation at maximum temperature**
- **Unobstructed access with swing-away door**
- **Optional element economiser transformer**

A micro switch is fitted which disconnects the power supply from the elements as the door opens. A 1400°C temperature fuse safeguards the elements from overheating.

FR-720

DIMENSIONS	H	W	D	
Internal	10 ×	12·5 ×	18	cm
	4 ×	5 ×	7	in
Overall	61 ×	48 ×	57	cm
	24 ×	19 ×	22	in
Base		51 ×	42	cm
		20 ×	16½	in
Weight, net		80 kg (175 lb)		
Maximum power rating		2·5 kW		

Additional technical information refer to page 306.

FR-720

BOX FURNACE, *Gallenkamp*, **manual control, for 1400°C,** with energy regulator, 9 cm scale pyrometer indicator and element protection fuse. For single phase a.c. supplies.

For 230/240V	Each	**£190. 0. 0.**	*b*
For 210/220V	Each	**£190. 0. 0.**	*bN*
For 200V	Each	**£190. 0. 0.**	*bN*

FR-721

BOX FURNACE, *Gallenkamp*, **manual control, for 1400°C,** as FR-720 and with **element economiser transformer.** For single phase a.c. supplies.

For 230/240V	Each	**£210. 0. 0.**	*b*
For 210/220V	Each	**£210. 0. 0.**	*bN*
For 200V	Each	**£210. 0. 0.**	*bN*

When ordering please state voltage to nearest 10V and nature of supply.

FR-720 and FR-721 available for other voltages. Quotations on receipt of details.

REPLACEMENT PARTS

FR-722	**Heating elements,** 10 mm.	Set of 6	**£26. 10. 0.**	*m*
FR-723	**Temperature fuse,** 1400°C working.	Each	**£1. 15. 0.**	*m*
FR-672	**Twin bore sleeve,** for temperature fuse	For prices see entries in List No. sequence.		
FR-674	**Outer protecting sheath,** for temperature fuse or thermocouple ...			
FS-305	**Thermocouple element,** with insulators			

When ordering replacement elements please state voltage and whether element economiser transformer is fitted.

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

For suitable FLOOR STANDS—see pages 326/7.

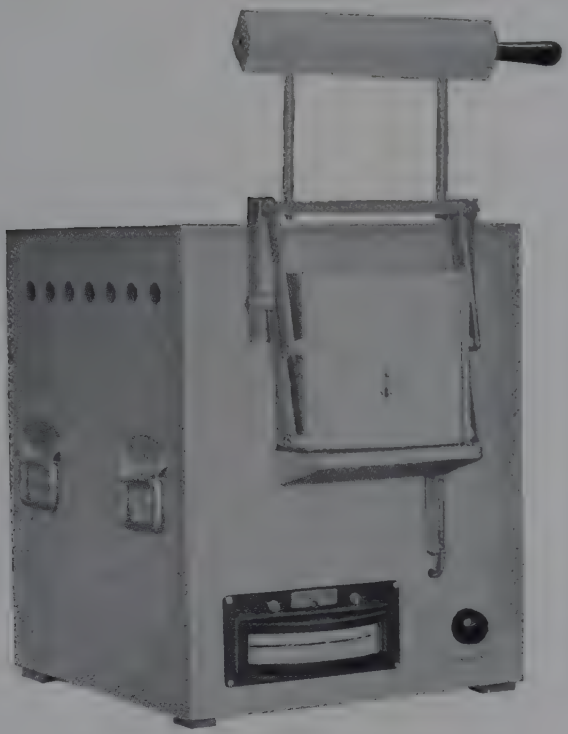
Items on this page normally available from stock except those coded *N*.

Gallenkamp BOX FURNACES, 1400°C

SILICON CARBIDE HEATING ELEMENTS
AUTOMATIC CONTROL

General purpose laboratory furnaces for operation at high temperatures.

- **Heating to 1400°C in under 3 hours**
- **Fluctuation less than 5°C**
- **Reliable long term continuous operation at maximum temperature**
- **Optional element economiser transformer**



FR-740

Operator and furnace safety are ensured by a door switch, a thermocouple breakage protection circuit, and an excess temperature fuse, each of which disconnects the power supply from the elements.

DIMENSIONS

Size No.	1	2	
	H W D	H W D	
Internal	10 × 15 × 30	15 × 23 × 38	cm
	4 × 6 × 12	6 × 9 × 15	in
Overall	93 × 57 × 70	102 × 61 × 79	cm
	36½ × 22½ × 27½	40 × 24 × 31	in
Base	53·5 × 55	61 × 62·5	cm
	21 × 21½	24 × 24½	in
Weight, net	138 kg (305 lb)	185 kg (400 lb)	
Power rating max.	3·5	6 kW	

For additional technical information refer to page 306.

FR-740

BOX FURNACES, *Gallenkamp,* **automatic ON/OFF control, for 1400°C,** with 20 cm scale controller, energy regulator, door operated safety switch and element protection fuse. For single phase a.c. supplies.

Size No.		1	2	
For 230/240V	Each	**£279. 0. 0.**	**£344. 0. 0.**	*b*
For 210/220V	Each	**£279. 0. 0.**	**£344. 0. 0.**	*bN*
For 200V	Each	**£279. 0. 0.**	**£344. 0. 0.**	*bN*

FR-741

BOX FURNACES, *Gallenkamp,* **automatic ON/OFF control for 1400°C,** as FR-740 and with **element economiser transformer.** For single phase a.c. supplies.

Size No.		1	2	
For 230/240V	Each	**£314. 0. 0.**	**£388. 0. 0.**	*g*
For 210/220V	Each	**£320. 0. 0.**	**£388. 0. 0.**	*gN*
For 200V	Each	**£320. 0. 0.**	**£388. 0. 0.**	*gN*

When ordering please state voltage to nearest 10V and nature of supply.

FR-740 and FR-741 available for other voltages. Quotations on receipt of details.

The maximum power rating of these furnaces is relatively high for single phase electricity supplies. Furnaces can be made for operation on 3-phase supplies—details on request.

REPLACEMENT PARTS

		1	2	
FR-742	**Heating elements, 14 mm.**			
	Size No.	1	2	
	Set of	6	8	
	Per set	**700/–**	**1060/–**	*m*
FR-744	**Temperature fuse, for 1400°C working.**		Each **£2. 6. 0.**	*m*
FR-672	**Twin bore sleeve, for temperature fuse**	For prices see entries in List No. sequence.		
FR-674	**Outer protecting sheath, for temperature fuse or thermocouple** ...			
FR-592	**Amplifier valve,** *Brimar* **type 6158**			
FR-594	**Indicator lamp bulb**			
FR-676	**Thermocouple element, with insulators**			

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

When ordering replacement elements please state voltage and whether element economiser transformer is fitted.

For suitable **FLOOR STANDS**—see pages 326/7.

Items on this page normally available from stock except those coded *N*.

Gallenkamp BOX FURNACE, 1500°C

MOLYBDENUM DISILICIDE HEATING ELEMENTS
AUTOMATIC CONTROL

A box furnace for control and research applications concerned with the behaviour of metals, ceramics and other materials in air at high temperatures.

- **Heating to 1500°C in 6 hours**
- **Fluctuation 5°C**
- **Safe low-voltage heating**
- **Long-life heating elements**

The furnace stands on a steel control unit which houses the controls and transformer needed to provide the low heater voltages required. The switch on the front panel is used to select the element supply voltage for particular operating conditions.

Safety Devices

The controller is 'fail safe' and has a thermocouple breakage protection circuit. A fuse fitted in the furnace cuts the power supply to the elements if 1500°C is exceeded.

Note: Molybdenum disilicide elements are specifically designed for high temperature operation and owing to their nature **this furnace is not suitable for routine operation below 1000°C.**

Additional technical information refer to page 306.

FR-770

DIMENSIONS

Furnace

	H W D
Working space	18×18×32 cm
	7× 7×12½ in
Overall	107×84×85 cm
	42×33×33½ in
Base	63·5×75 cm
	25½×30 in
Weight, net	250 kg
	540 lb

Control unit

	H W D
Overall	92×63×76 cm
	36×25×30 in
Weight, net	195 kg
	425 lb

Maximum power rating 10 kVA.

FR-770

BOX FURNACE, *Gallenkamp*, **automatic ON/OFF control, for 1500°C,** with control unit, transformer, 20 cm scale controller, energy regulator and element protection fuse. For single phase a.c. supplies.
For 200/250V ... ... Each **£617.10. 0.** *g*

When ordering please state voltage and nature of supply.

Available for other voltages. Quotations on receipt of details.

The maximum power rating of these furnaces is relatively high for single phase electricity supplies. Furnaces can be made for operation on 3-phase supplies—details on request.

REPLACEMENT PARTS

FR-772	**Heating elements.** Four are used in furnace FR-770.	Each **£17. 0. 0.** *m*
FR-774	**Temperature fuse,** for 1500°C working.	Each **£1. 4. 0.** *m*
FR-672	**Twin bore sleeve,** for temperature fuse	For prices see entries in List No. sequence.
FR-674	**Outer protecting sheath,** for temperature fuse or thermocouple ...	
FR-592	**Amplifier valve,** *Brimar* type 6158	
FR-594	**Indicator lamp bulb**	
FR-676	**Thermocouple element,** with insulators	

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

THE HEAT TREATMENT OF METALS

The use of *Gallenkamp* furnaces for the precision heat treatment of metals has become an accepted practice. A muffle furnace for preheating or for tempering combines ideally with a box furnace for hardening. If both furnaces are used with floor stands a very convenient outfit is established.

Suitable paired furnaces and accessories are as follows:

FR-572 size 2 (1100°C) with floor stand FS-922
and
FR-740 size 1 (1400°C) with floor stand FS-940.

FR-572 size 3 (1100°C) with floor stand FS-924
and
FR-740 size 2 (1400°C) with floor stand FS-942.

All items on this page normally available from stock.

Gallenkamp SINGLE AND TWIN

WOUND WIRE HEATING ELEMENTS

A range of general purpose tube furnaces especially suited to the determination of carbon and sulphur in steel and for other combustion or reduction work requiring single or twin horizontal work tubes.

Gallenkamp

FS-212
FS-215

Safety Devices

To prevent damage from accidental overheating, all furnaces are equipped with easily replaceable temperature fuses; furnaces FS-212 and FS-232 are fitted with fuses FS-249 to permit working to 1000°C; furnaces FS-215 and FS-235 are fitted with fuses FS-250 to permit 1200°C working.

FURNACE WORK TUBES

Where used, one tube is required by FS-212 or FS-215 and two tubes are required by FS-232 or FS-235.

TW-495

Furnace work tubes, impervious aluminous porcelain.

For furnace size No.	1	2
Tube size No.	2	8

TW-505

Furnace work tubes, impervious mullite.

For furnace size No.	1	2
Tube size No.	2	8

For full details and prices see entries in List No. sequence.

SINGLE TUBE FURNACES

DIMENSIONS

Size No.	1	2	
Bore	3·8	5	cm
	1½	2	in
Length	30	40	cm
	12	16	in
	H W D	H W D	
Overall	37 × 33 × 23	43 × 43 × 25	cm
	14½ × 13 × 9	17 × 17 × 10	in
Base	32·5 × 22	39·5 × 24·5	cm
	13 × 8¾	17 × 9¾	in
Maximum power rating	1·0	2·0	kW
Weight, net	20	27	kg
	45	60	lb

Additional technical information refer to page 306.

FS-212

SINGLE TUBE FURNACES, *Gallenkamp*, **manual control, for 1000°C,** with energy regulator, 5·7 cm scale pyrometer indicator, and 1000°C element protection fuse FS-249. For single phase a.c. supplies.

Size No.		1	2
For 220/240V	Each	**£49. 0. 0.**	**£64. 0. 0.** *b*
For 200/210V	Each	**£49. 0. 0.**	**£64. 0. 0.** *bN*
For 110/120V	Each	**£52. 0. 0.**	**£67. 0. 0.** *bN*

FS-215

SINGLE TUBE FURNACES, *Gallenkamp*, **manual control, for 1200°C,** with energy regulator, 5·7 cm scale pyrometer indicator, and 1200°C element protection fuse FS-250. For single phase a.c. supplies.

Size No.		1	2
For 220/240V	Each	**£62. 0. 0.**	**£75. 0. 0.** *b*
For 200/210V	Each	**£62. 0. 0.**	**£75. 0. 0.** *bN*
For 110/120V	Each	**£65. 0. 0.**	**£78. 0. 0.** *bN*

When ordering please state voltage and nature of supply.

Items on this page normally available from stock except those coded *N*.

TUBE FURNACES, 1000°C or 1200°C

MANUAL CONTROL

- **Heating to 1200°C in 1¼ hours**
- **Suitable for use with or without additional work tubes**
- **Thermocouple pockets moulded into refractory castings leave work tubes unobstructed**

FS-232 or FS-235 with work tubes

TWIN TUBE FURNACES

DIMENSIONS

Size No.	1	2	
Bore	3·8	5	cm
	1½	2	in
Length	30	40	cm
	12	16	in
	H W D	H W D	
Overall	47 × 36 × 31	47 × 46 × 33	cm
	18½ × 14 × 12	18½ × 18 × 13	in
Base	32·5 × 30·5	42·5 × 33	cm
	12¾ × 12	16¾ × 13	in
Maximum power rating	2·0	3·0	kW
Weight, net	30	41	kg
	65	92	lb

Additional technical information refer to page 306.

FS-232

TWIN TUBE FURNACES, *Gallenkamp*, **manual control, for 1000°C,** with energy regulator, 5·7 cm scale pyrometer indicator, and 1000°C element protection fuse FS-249. For single phase a.c. supplies.

Size No.		1	2	
For 220/240V	Each	**£55. 0. 0.**	**£71. 0. 0.**	*b*
For 200/210V	Each	**£55. 0. 0.**	**£71. 0. 0.**	*bN*
For 110/120V	Each	**£65. 0. 0.**	**£81. 0. 0.**	*bN*

FS-235

TWIN TUBE FURNACES, *Gallenkamp*, **manual control, for 1200°C,** with energy regulator, 5·7 cm scale pyrometer indicator, and 1200°C element protection fuse FS-250. For single phase a.c. supplies.

Size No.		1	2	
For 220/240V	Each	**£71. 0. 0.**	**£82. 0. 0.**	*b*
For 200/210V	Each	**£71. 0. 0.**	**£82. 0. 0.**	*bN*
For 110/120V	Each	**£81. 0. 0.**	**£82. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS for single and twin tube furnaces

FS-240 **Wound single tube refractories,** for FS-212 and FS-215.

Size No.		1	2	
For 200/210 or 220/240V	Each	**115/–**	**170/–**	*b*
For 110/120V	Each	**177/6**	**230/–**	*b*

FS-244 **Wound twin tube refractories,** for FS-220 and FS-235.

Size No.		1	2	
For 200/210 or 220/240V	Each	**215/–**	**310/–**	*b*
For 110/120V	Each	**250/–**	**347/6**	*b*

FS-249 **Temperature fuse 1000°C working,** for FS-212 and FS-232.

Size No.	1	2	
Each	**54/–**	**15/–**	*m*

FS-250 **Temperature fuses, 1200°C working,** for FS-215 and FS-235.

Size No.	1	2	
Each	**81/–**	**15/–**	*m*

FS-252 **Single bore sleeves,** for temperature fuses.
Pack of 3 **£1. 6. 6.**

FS-254 **Thermocouple elements,** with insulators, for FS-212 and FS-232.

Size No.	1	2	
Each	**21/–**	**23/6**	*b*

FS-256 **Thermocouple elements,** with insulators, for FS-215 and FS-235.

Size No.	1	2	
Each	**170/–**	**195/–**	*m*

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

For suitable FLOOR STANDS—see pages 326/7.

All items on this page normally available from stock.

Gallenkamp TUBE FURNACES, 1400°C

SILICON CARBIDE HEATING ELEMENTS
MANUAL OR AUTOMATIC CONTROL

High temperature horizontal tube furnaces designed particularly for combustion work, including the determination of carbon and sulphur in all types of steel, and sulphur in coal and petroleum products. Also suitable for other tests including Ash Fusion Points.

FS-300

Automatic ON/OFF control. A wall-mounting indicating automatic ON/OFF controller, complete with wall fixing bracket, is supplied with this version of the furnace. The mains switch controls the mains supply to both controller and furnace.

Safety devices

A thermocouple breakage protection circuit is built into the 'fail safe' automatic controller, but these furnaces are **not** fitted with temperature fuses.

Power to the heating elements is supplied by a four-range step-down transformer which permits compensation to be made for the slow increase in element resistance due to ageing.

DIMENSIONS

Bore	3·0 cm ($1\frac{3}{16}$ in)
Heated length	15 cm (6 in)
	H W D
Overall	57 × 47 × 36 cm
	$22\frac{1}{2}$ × $18\frac{1}{2}$ × 14 in
Base	39·5 × 32 cm
	$15\frac{3}{4}$ × $12\frac{3}{4}$ in
Maximum power rating	1·25 kW
Weight, net	77 kg (170 lb)

Additional technical information refer to page 306.

- **Heating to 1400°C in under 2 hours**
- **Built-in element economiser transformer**

FS-300

TUBE FURNACE, *Gallenkamp*, **manual control, for 1400°C,** with 4-step transformer, energy regulator, and 9 cm scale pyrometer indicator. For single phase a.c. supplies. **Requires but does not include work tube.**

For 200/250V	Each	**£126. 15. 0.** *b*
For 110/120V	Each	**£126. 15. 0.** *bN*

FS-302

TUBE FURNACE, *Gallenkamp*, **automatic control, for 1400°C,** with 4-step transformer, energy regulator, and 20 cm scale wall mounting indicating automatic ON/OFF controller and bracket. For single phase a.c. supplies. **Requires but does not include work tube.**

For 200/250V	Each	**£191. 0. 0.** *b*
For 110/120V	Each	**£191. 0. 0.** *bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

FS-304	**Heating element,** 14 mm dia. Two required.	Each **£5. 18. 0.** *m*
FS-305	**Thermocouple element,** with insulators.	Each **£9. 0. 0.** *m*
FR-592	**Amplifier valve,** *Brimar* Type 6158	For prices see entries in List No. sequence
FR-594	**Indicator lamp bulb**	For prices see entries in List No. sequence

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

MODIFIED FURNACES to BS 1016, Part 6, for the determination of carbon, hydrogen, chlorine and sulphur in coal or coke. Provide the asymmetric distribution of temperature required for the test. For single phase a.c. supplies. **Require but do not include work tube.**

FS-320

TUBE FURNACE, *Gallenkamp*, modified FS-300.

For 200/250V	Each	**£144. 10. 0.** *b*
For 110/120V	Each	**£144. 10. 0.** *bN*

FS-325

TUBE FURNACE, *Gallenkamp*, modified FS-302.

For 200/250V	Each	**£204. 0. 0.** *b*
For 110/120V	Each	**£204. 0. 0.** *bN*

REPLACEMENT PART

FS-328	**Heating element,** 14 mm dia. Two required.	Each **£6. 0. 0.** *m*
FS-305	**Thermocouple element, with insulators.** For price see entry in List No. sequence.	

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

ACCESSORIES

FURNACE WORK TUBES

One tube is required for any of the furnaces FS-300, FS-302, FS-320 or FS-325.

TW-495	**Furnace work tubes, impervious aluminous porcelain size No. 4.**
TW-505	**Furnace work tubes, impervious mullite size No. 4.**

For full details and prices see entries in List No. sequence.

Items on this page normally available from stock except those coded *N*.

Gallenkamp TWIN TUBE FURNACES, 1400°C

SILICON CARBIDE HEATING ELEMENTS
MANUAL CONTROL

Popular twin tube furnaces for conducting tests in duplicate or for making two different tests at the same time under identical temperature conditions.

- **Heating to 1400°C in 2 hours**
- **Optional element economiser transformer**

Safety devices
To prevent accidental damage from overheating, the furnace is fitted with a 1400°C temperature fuse.

DIMENSIONS

Bore	3·2 cm (1¼ in)
Heated length	18 cm (7 in)
	H W D
Overall	60 × 46 × 48 cm
	24 × 18 × 19 in
Base	51 × 42 cm
	20 × 16½ in
Weight, net	68 kg (150 lb)
Maximum power rating	2·5 kW

Additional technical information refer to page 306.

FS-350

TWIN TUBE FURNACE, *Gallenkamp,* **manual control, for 1400°C,** with energy regulator, 9 cm scale pyrometer indicator, and element protection fuse. For single phase a.c. supplies. **Requires but does not include work tubes.**

For 230/240V	Each **£150. 0. 0.**	*b*
For 210/220V	Each **£150. 0. 0.**	*bN*
For 200V	Each **£150. 0. 0.**	*bN*

FS-351

TWIN TUBE FURNACE, *Gallenkamp,* **manual control,** as FS-350 but including **element economiser transformer.** For single phase a.c. supplies. **Requires but does not include work tubes.**

For 230/240V	Each **£187. 0. 0.**	*g*
For 210/220V	Each **£187. 0. 0.**	*gN*
For 200V	Each **£187. 0. 0.**	*gN*

When ordering please state voltage to nearest 10V and nature of supply.

FS-350 and FS-351 available for other voltages. Quotations on receipt of details.

FS-350

REPLACEMENT PARTS

FR-722	**Heating elements,** 10 mm diameter, set of six...	For prices see entries in List No. sequence.
FR-723	**Temperature fuse,** 1400°C working	
FR-672	**Twin bore sleeve,** for temperature fuse	
FR-674	**Outer protecting sheath,** for temperature fuse or thermocouple ...	
FS-305	**Thermocouple element,** with insulators	

When ordering replacement elements please state voltage and whether element economiser transformer is fitted.

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

ACCESSORIES

FURNACE WORK TUBES

Two tubes are required for either furnace FS-350 or FS-351.

TW-495	**Furnace work tubes, impervious aluminous porcelain size No. 4.**
TW-505	**Furnace work tubes, impervious mullite size No. 4.**

For full details and prices see entries in List No. sequence.

For suitable FLOOR STANDS—see pages 326/7.

Items on this page normally available from stock except those coded *N*.

Gallenkamp TUBE FURNACE, 1500°C

MOLYBDENUM DISILICIDE HEATING ELEMENTS
AUTOMATIC CONTROL

Tube furnaces for research and control applications concerned with the behaviour of high temperature materials in specific atmosphere. The smaller furnace is especially suitable for the determination of the fusibility of coal ash and coke ash.

- **Heating to 1500°C in 4½ hours**
- **Continuous operation at 1500°C**
- **Fluctuation about 1°C**

Gallenkamp

FS-400 without control unit

The step-down heater voltage transformer is housed with the controls in a steel unit separate from the furnace.

DIMENSIONS

Furnace

Size No.	1	2
Heating chamber length	27 cm (10½ in)	32 cm (12½ in)
Outside diameter of work tube	39 mm (1½ in)	80 mm (3¼ in)
	H W D	H W D
Overall	46 × 53 × 38 cm 18 × 21 × 15 in	53 × 71 × 46 cm 21 × 28 × 18 in
Base	52 × 36 cm 20½ × 14¼ in	47 × 71 cm 18 × 28 in
Weight, net	50 110	120 kg 260 lb

Control unit

	H W D	H W D
Overall	57 × 57 × 38 cm 22½ × 22½ × 15 in	57 × 57 × 38 cm 22½ × 22½ × 15 in
Weight, net	190 85	310 lb 140 kg
Maximum power rating	2·5	7·0 kVA

Safety Devices

A thermocouple breakage protection circuit is built into the 'fail-safe' controller and an element protection fuse prevents the element being overheated.

Note: Molybdenum disilicide elements are specifically designed for high temperature operation and owing to their nature **these furnaces are not suitable for routine operation below 1000°C.**

Additional technical information refer to page 306.

FS-400

TUBE FURNACES, *Gallenkamp*, **automatic ON/OFF control, for 1500°C,** with step-down transformer, 20 cm scale controller, energy regulator, and element protection fuse. For single phase a.c. supplies. **Requires but does not include work tube and end plugs.**

Size No.		1	2	
For 200/250V	Each	**£283. 0. 0.**	**£355. 0. 0.**	*g*

When ordering please state voltage and nature of supply.

Available for other voltages. Quotations on receipt of details.

The maximum power rating of the size No. 2 furnace is relatively high for single phase electricity supplies. Furnaces can be made for operation on 3-phase supplies—details on request.

REPLACEMENT PARTS

FS-410	**Heating element,** for furnace Size No. 1, one required. Each **£11. 12. 6.**	*m*
FS-412	**Heating element,** for furnace Size No. 2, two required. Each **£16. 0. 0.**	*m*
FR-774	**Temperature fuse,** for 1500°C working	For prices see entries in List No. sequence.
FR-672	**Twin bore sleeve,** for temperature fuse	
FR-674	**Outer protecting sleeve,** for temperature fuse or thermocouple	
FR-592	**Amplifier valve,** *Brimar* Type 6158...	
FR-594	**Indicator lamp bulb**	
FR-676	**Thermocouple element,** with insulators	

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

ACCESSORIES

FURNACE WORK TUBES AND END PLUGS

NOTE: One tube and two plugs are required for FS-400. End plugs must be used in order to obtain a working temperature of 1500°C.

TW-500 **Furnace work tubes, porous fused alumina.**

Furnace Size No.	1	2
Tube Size No.	6	10

TW-505 **Furnace work tubes, impervious mullite.**

Furnace Size No.	1	2
Tube size No.	6	10

TW-510 **Tube end plugs.**

Furnace Size No.	1	2
Tube size No.	6	10

For details and prices see entries in List No. sequence

All items on this page normally available from stock.

Gallenkamp CRUCIBLE FURNACES, 1000°C

WOUND WIRE HEATING ELEMENTS
MANUAL CONTROL

Two simple vertical furnaces for general laboratory work.

- **Heating to 1000°C in 1½ hours**
- **Salt bath available for larger furnace**

These furnaces are not fitted with temperature fuses. A removable refractory 'plug' cover is fitted to the top of the furnace.

DIMENSIONS

Size No.	1	2	
	Height bore	Height bore	
Working space	23 × 10	38 × 15 cm	
	9 × 4	15 × 6 in	
	H W D	H W D	
Overall	50 × 33 × 33	76 × 38 × 38 cm	
	20 × 13 × 13	30 × 15 × 15 in	
Base	32·5 × 32·5	38 × 38 cm	
	13 × 13	14 × 14 in	
Maximum power rating	1·25	2·5	kW

Additional technical information refer to page 306.

FS-470

FS-470

CRUCIBLE FURNACES, *Gallenkamp*, **manual control, for 1000°C,** with 5·7 cm scale pyrometer indicator, load lamp, energy regulator and refractory cover. For single phase a.c. supplies.

Size No.		1	2	
For 220/240V	Each	**£58. 0. 0.**	**£84. 0. 0.**	*b*
For 200/210V	Each	**£58. 0. 0.**	**£84. 0. 0.**	*bN*
For 110/120V	Each	**£60. 0. 0.**	**£86. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

FS-472 **Wound tubes.**

Size No.		1	2	
For 200/210 or 220/240V	Each	140/–	250/–	*b*
For 110/120V	Each	180/–	290/–	*bN*

FS-476 **Covers.**

Size No.	1	2	
Each	94/–	100/–	*b*

FS-478 **Thermocouple element.**

Size No.	1	2	
Each	13/3	13/3	*m*

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

FS-480

SALT BATH, consisting of a Calorised welded steel pot 46 cm deep × 12 cm internal diameter, flanged at the top. This fits into vertical tube furnace FS-470, size 2, and thus forms an economical salt bath unit for heat treatment of metals at temperatures up to 1000°C. Capacity approximately 5 kg of salt. Each **£12. 15. 0.** *m*

Salts for heat treatment of metals. Suitable bath materials for general purposes are a mixture of equal proportions of sodium nitrite and sodium nitrate (range 160–400°C) and sodium nitrite (range 350–650°C). For higher temperature salts and special purpose salts a specialised supplier such as Imperial Chemical Industries Ltd., should be consulted

Items on this page normally available from stock except those coded *N*.

Gallenkamp ASH FURNACES, 500°C and 815°C

WOUND WIRE HEATING ELEMENTS
AUTOMATIC CONTROL

For low temperature pre-burning and high temperature ashing of coal and coke to BS 1016, Parts 3 and 4 and to the National Coal Board Analysts' Handbook, Fuel Research Station 'Methods of Analysis of Coal and Coke'—Survey Paper No. 44.

These furnaces are designed to hold eight 75 mm ash dishes at uniform temperature and in controlled conditions of ventilation.

Gallenkamp

FS-530 without controller

DIMENSIONS	FS-530			FS-540		
	H	W	D	H	W	D
Internal	9 ×	17 ×	46 cm	9 ×	17 ×	46 cm
	3½ ×	6¾ ×	18 in	3½ ×	6¾ ×	18 in
Overall	43 ×	30 ×	50 cm	43 ×	38 ×	50 cm
	12 ×	12 ×	19½ in	17 ×	15 ×	19½ in
Base		33·5 ×	50 cm		38 ×	54 cm
		13¼ ×	19¾ in		15 ×	21¼ in
Chimney	61 cm (24 in) high			11·5 cm (4½ in) high		
Weight, net	52·5 kg			52·5 kg		
	116 lb			116 lb		
Maximum power rating	5 kW			3·5 kW		

The front of the low temperature furnace has a simple flap door giving an air-tight closure. Air is drawn through ducts at the back of the case into the space surrounding the muffle where it becomes heated. This pre-heated air then passes through the muffle and enters the chimney through a specially shaped foot casting. Thus uniform conditions obtain throughout the working space.

The front of the high temperature furnace is closed by a flap door which is slotted to introduce air uniformly across the front of the muffle, the air being drawn through the muffle by a small chimney at the back. The chimney is fitted with a specially shaped foot casting. This arrangement gives air flow conditions which are necessary for proper combustion.

Additional technical information refer to page 306.

FS-530

ASH FURNACE, *Gallenkamp*, **automatic ON/OFF control for 500°C (pre-burning)** with wall mounting 20 cm scale indicating controller and bracket, energy regulator and power relay. For single phase a.c. supplies.

For 220/240V	Each **£160. 0. 0.**	g
For 200/210V	Each **£160. 0. 0.**	g*N*
For 110/120V	Each **£162. 10. 0.**	g*N*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

FS-532	**Spare wound muffle.** For 200/210 or 220/240V ... ... For 110/120V	 Each £13. 15. 0. b Each £14. 17. 6. b*N*
FR-592	**Amplifier valve,** *Brimar* **Type 6158**	For prices see entries in List No. sequence.
FR-594	**Indicator lamp bulb**	
PX-052	**Thermocouple, chromel : alumel**	

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

FS-540

ASH FURNACE, *Gallenkamp*, **automatic ON/OFF control for 815°C (ashing),** with wall mounting 20 cm scale indicating controller and bracket, energy regulator and power relay. For single phase a.c. supplies.

For 220/240V	Each **£156. 10. 0.**	g
For 200/210V	Each **£156. 10. 0.**	g*N*
For 110/120V	Each **£159. 10. 0.**	g*N*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

FS-542	**Spare wound muffle.** For 200/210 or 220/240V ... ... For 110/120V	 Each £12. 12. 6. b Each £14. 12. 6. b*N*
FR-592	**Amplifier valve,** *Brimar* **Type 6158**	For prices see entries in List No. sequence.
FR-594	**Indicator lamp bulb**	
PX-052	**Thermocouple, chromel : alumel**	

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

For suitable FLOOR STANDS—see pages 326/7.

Items on this page normally available from stock except those coded *N*.

Gallenkamp VOLATILE MATTER FURNACE, 900°C

WOUND WIRE HEATING ELEMENTS
MANUAL CONTROL

Suitable for the test specified in BS 1016, Parts 3 and 4 and the Fuel Research Station 'Methods of Analysis of Coal and Coke'—Survey Paper 44.

The heating chamber is a refractory muffle wound with a wire element which is graded to give the required temperature distribution. A 5 cm (2 in) diameter flue at the back, formed by a cast aluminium elbow and chimney, is fitted with the draught controlling vane.

An element protection fuse is fitted to avoid accidental damage from overheating.

DIMENSIONS	H		W		D	
Internal	6	×	10	×	25	cm
	2⅜	×	3⅞	×	10	in
Overall	38	×	30	×	46	cm
	15	×	12	×	18	in
Base			11½	×	14	in
			29·5	×	35·5	cm
Weight, net			25 kg (55 lb)			
Maximum power rating			1·5 kW			

Additional technical information refer to page 306.

FS-560

FS-560

VOLATILE MATTER FURNACE, *Gallenkamp*, **manual control, for 900°C,** with energy regulator and chimney. For single phase a.c. supplies.

For 220/240V	Each	**£47. 0. 0.**	*b*
For 200/210V	Each	**£47. 0. 0.**	*bN*
For 110/120V	Each	**£61. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

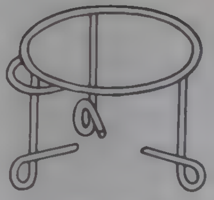
FS-564	**Wound muffle.** For 200/210V or 220/240V ... ... For 110/120V	Each **£5. 7. 6.** Each **£6. 0. 0.**	*b* *bN*
FR-526	**Temperature fuse,** 1000°C working	For prices see entries in List No. sequence.	
FR-530	**Twin bore sleeve** for temperature fuse		
FR-531	**Outer protecting sheath** for temperature fuse		

ACCESSORIES

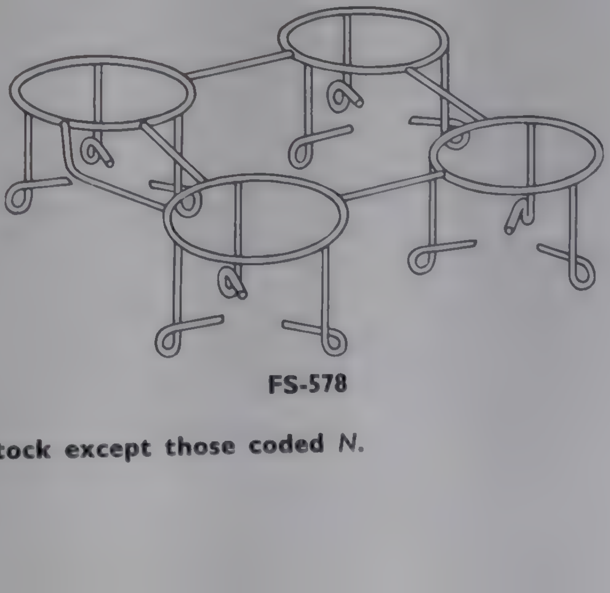
PX-045	**Indicating pyrometer,** 10 cm edgewise scale, range 0 to 1200°C, with mounting bracket	For prices see entries in List No. sequence.	
FS-570	**Thermocouple,** chromel:alumel, for measuring furnace temperature, 15 cm, complete with porcelain sheath, head and 46 cm compensating cable.	Each **£1. 16 0.**	*b*
FS-572	**Thermocouple,** chromel:alumel, unsheathed, for measuring crucible temperatures. Complete with 46 cm compensating cable	Each **£1. 14. 0.**	*b*
FS-574	**Crucible,** *Vitreosil* translucent silica, to BS 1016: Part 3, 25 mm dia. × 40 mm high, complete with capsule type lid. Each crucible is marked with a serial number which also appears on its lid. Pack of 10 **£21. 10. 0.**	Each **£2. 7. 6.**	*m*
FS-576	**Stand, single test,** of heat resistant niobium steel wire, to BS 1016: Part 3. Dozen **£3. 0. 0.**	Each **£0. 6. 4.**	*b*
FS-578	**Stand, 4-test,** of heat resistant niobium steel wire, to BS 1016: Part 3. Dozen **£15 10. 0.**	Each **£1. 8. 0.**	*b*
FS-580	**Disks,** asbestos paper, in pack of 50.	Pack **£0. 2. 6.**	*b*

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

For suitable FLOOR STANDS—see pages 326/7.



FS-576



FS-578

Items on this page normally available from stock except those coded *N*.

Gallenkamp DTA FURNACE, 1100°C

WOUND WIRE HEATING ELEMENTS

DIFFERENTIAL THERMAL ANALYSIS FOR

- **Mineralogy and soil sciences**
  - **Analysis and assays in prospecting surveys**
    - **Control of clay, minerals and ceramics**
      - **Substrata surveys for petroleum deposits**

Ref.: Roberts and Grimshaw, Trans, Brit. Cer. Soc. 69, 1945, 44.

FS-700 with FS-710 and FS-712

CONTROL SYSTEMS

(a) **Manual.** A *Variac* transformer ED-602 may be used for manual control of the rate of rise of temperature. It may either be set at one arbitrary value and the temperature of the standard noted at discreet intervals, or it may be adjusted from time to time so as to maintain a roughly constant rate of rise in temperature.

(b) **Automatic.** Where an accurate rate of rise is needed, FS-740 programme controller is used. This is an indicating pyrometer, range 0 to 1200°C with a chromel:alumel thermocouple and a cam-operated programme controller. Cams to provide required heating rates are cut by the user from pre-calibrated blanks. The usual heating rate is constant at 10°C/min from near ambient to 1000°C. The controller output is fed to a silicon controlled rectifier power control unit to give continuous proportional temperature control.

DIMENSIONS	H	W	D	
Overall	26 ×	19·5 ×	20·5	cm
	10¼ ×	7¾ ×	8	in
Base		20 ×	20·5	cm
		7¾ ×	8	in
Weight, net	8 kg (18 lb)			
Maximum power rating	500W			

Additional technical information refer to page 306.

FS-700

DTA FURNACE, *Gallenkamp,* for differential thermal analysis. Similar to furnace FS-212, with a refractory tube 20 × 4·5 cm bore. The tube accommodates two FS-710 heating blocks, and the furnace case is recessed at each end of the tube to accept the block flanges. **Supplied without controls, heating blocks or heating cells.** For single phase a.c. supplies.

For 220/240V	Each	**£19. 10. 0.**	*b*
For 200/210V	Each	**£19. 10. 0.**	*bN*
For 110/120V	Each	**£19. 10. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PART

FS-702	**Wound tube**	Each	**£3. 12. 6.**	*b*

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

ACCESSORIES

FS-710	**Heating block and cover,** fused alumina, *Roberts and Grimshaw* pattern, with recesses for one heating cell FS-712 and thermocouples. At least two required.	Each	**£3. 9. 0.**	*m*
FS-712	**Heating cell,** with separate compartments for standard and sample. At least two required.	Each	**£1. 16. 8.**	*m*
FS-721	**Thermocouple wire, chromel:alumel,** 26 swg, supplied as pair of wires each 9 metres long for constructing differential thermocouples	Pair	**£0. 16. 6.**	*b*
FS-728	**Cold Junction,** comprising a vacuum flask with thimbles to contain mercury for making connections between thermocouples, pyrometer and recorder.	Each	**£0. 17. 0.**	*c*

FS-730

DIFFERENTIAL TEMPERATURE RECORDER. *Cambridge* Model B, for use with chromel:alumel thermocouples. Range 1–0–1 mV, single dotted record every 20 sec, chart width 95 mm, chart speed 0·1 in/min. For 110/120 or 200/250V a.c. single phase supplies. Each **£89. 15. 0.** *fN*

REPLACEMENT PART

FS-732	**Charts,** for FS-730	Per 100	**£0. 13. 0.**	*fN*

FS-734

INDICATING PYROMETER, for measuring temperature of inert standard, bracket mounting scale 15 cm, range 0 to 1200°C. For chromel:alumel thermocouples. Each **£21. 0. 0.** *m*

ED-602

TRANSFORMER, *Variac,* enclosed, for manual control or rate of rise in temperature. For price see entry in List No. sequence.

FS-740

PROGRAMME CONTROLLER, as specification, to give automatic control of rate of rise in temperature. With two uncut cams graduated in time and temperature, one involute cam for fixed temperature control, power control unit, chromel : alumel thermocouple and compensating cable ... ... Each **£199. 10. 0.** *mN*

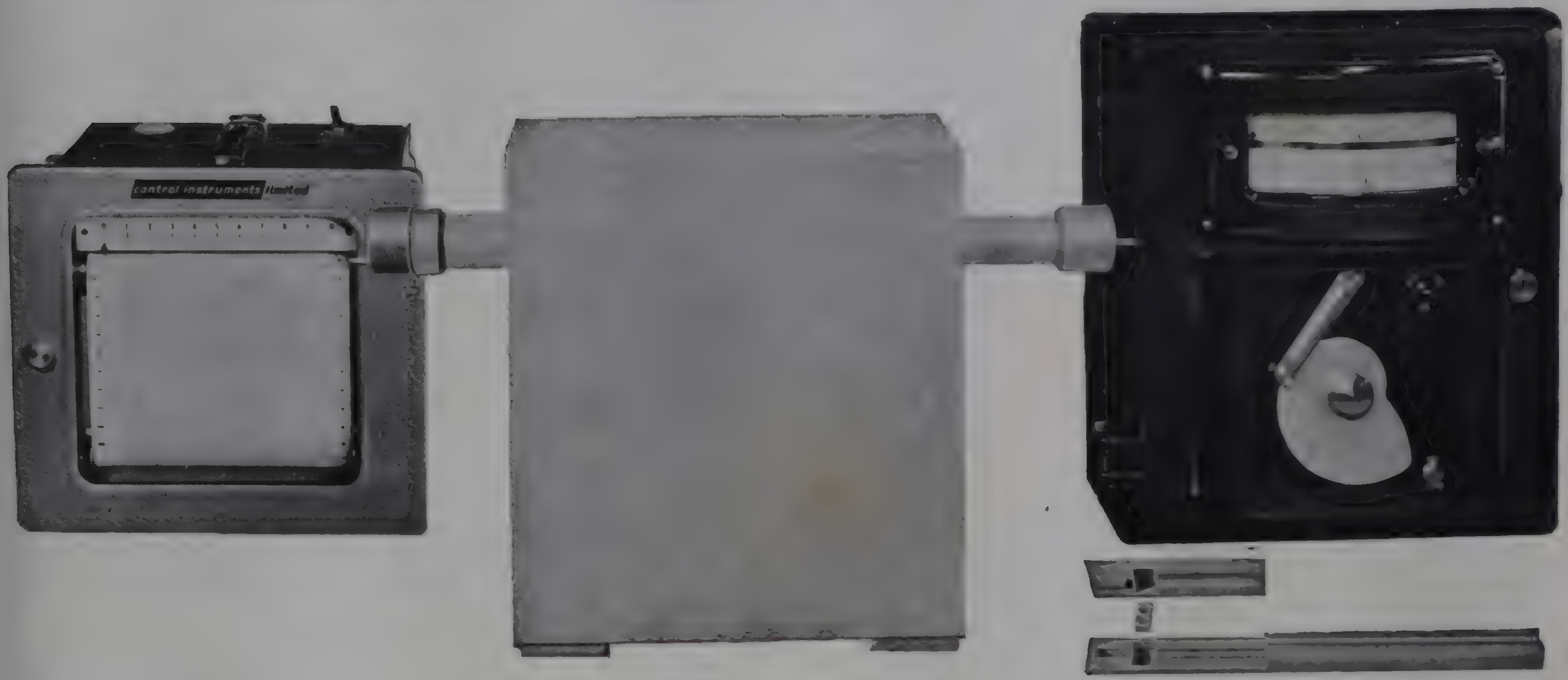
When ordering electrical accessories please state voltage and nature of supply.

Items on this page normally available from stock except those coded *N*.

Gallenkamp DTA FURNACE, 1200°C

WOUND WIRE HEATING ELEMENTS

For differential thermal analysis of minerals in controlled atmospheres. Designed in collaboration with the Cape Asbestos Fibres Ltd. Ref: A. A. Hodgson, J.Sci.Inst. 40, 61, 1963.



FS-750 with accessories

FURNACE DESIGN

The furnace comprises a refractory tube wound with a graded resistance wire heater, mounted in an asbestolite case and lagged with insulating bricks. A gas tight work tube 3·2 cm bore × 60 cm long passes through the furnace tube. Terminals for connecting the power supply are fitted in a compartment beneath the furnace. A platinum:13% rhodium platinum thermocouple for controlling the furnace temperature is mounted between the work tube and the furnace tube. The sample and inert material are placed in recesses in a fused alumina heating cell FS-762 which is mounted in heating block FS-760. Platinum:13% rhodium platinum differential measuring thermocouples FS-764 and FS-256 No. 1 are supplied. The samples and the thermocouple leads are shielded with cover FS-761. The assembly is placed in the work tube together with a solid refractory plug FS-763 to equalise the loading on the furnace. End fittings on the furnace work tube allow it to be sealed so that it can be evacuated or gas passed through it to maintain a controlled atmosphere around the samples. An inconel foil screen is placed between the furnace tube and the work tube to eliminate pick-up by the thermocouples from the heater winding.

CONTROL SYSTEM

Programme controller FS-768 automatically controls the rate of rise of temperature of the furnace. This instrument comprises an indicating pyrometer range 0 to 1200°C to connect to the furnace thermocouple, and a cam operated proportional programme controller. Cams to provide required heating rates are cut by the user from pre-calibrated blanks. The usual heating rate is constant from near ambient to 1200°C at 10°C/min. The controller output is fed to a silicon controlled rectifier power control unit to give continuous proportional temperature control.

It is recommended that, to increase work output, two complete furnace assemblies comprising furnace FS-750, heating block FS-760, cover FS-761, heating cell FS-762, refractory plug FS-763 and differential thermocouple assembly FS-764 should be purchased with each set of controls. One furnace can then be on test while the other is cooling and being prepared for the next test.

DIMENSIONS	H W D
Overall	26 × 19·5 × 32 cm
	10¼ × 7¾ × 12½ in
Base	32·5 × 20 cm
	12¾ × 7¾ in
Weight, net	15 kg (33 lb)
Power rating, max.	1·3 kW

Additional technical information refer to page 306.

INSTRUMENTATION

(a) Actual temperature of standard.
Indicating pyrometer FS-776, which automatically provides calibrating marks at 300, 600 and 900°C on the differential temperature record, is recommended.

(b) Temperature difference between standard and sample.
For very accurate analysis, it is necessary to record every detail of each individual peak. Recorder FS-770 with amplifier FS-772 and potentiometer FS-774 are recommended.

FS-750

DTA FURNACE, *Gallenkamp*, for differential thermal analysis, as specification. Supplied with thermocouple FS-526 No. 1, work tube FS-754 end fittings FS-756 and FS-757, and inconel foil FS-755. **Without controls or recorders.** For single phase a.c. supplies.

For 220/240V	Each	**£61. 10. 0.**	*b*
For 200/210V	Each	**£61. 10. 0.**	*bN*
For 110/120V	Each	**£61. 10. 0.**	*bN*

When ordering please state voltage and nature of supply. Replacements and accessories see next page.

Items on this page normally available from stock except those coded *N*.

Gallenkamp DTA FURNACE, 1200°C

WOUND WIRE HEATING ELEMENTS

Continued

REPLACEMENT PARTS

FS-256	**Thermocouple,** platinum:13% rhodium platinum size No. 1. For price see entry in List No. sequence.			
FS-752	**Wound Tube**	Each	£7. 7. 6.	*b*
FS-754	**Work Tube,** impervious aluminous porcelain, 39 mm outside dia. 32 mm bore, 600 mm long.	Each	£2. 7. 3.	*m*
FS-755	**Inconel foil,** 330 × 150 × 0·25 mm thick.	Each	£1. 3. 0.	*b*
FS-756	**End fitting,** with gas entry tubulure.	Each	£2. 15. 0.	*b*
FS-757	**End fitting,** demountable with gas entry and thermocouple insulators	Each	£9. 5. 0.	*b*
FS-758	**Sealing ring,** for FS-757	Dozen Each	£0 19. 6. £0 3. 3.	*b*
FS-759	**Thermocouple insulators,** for FS-757.	Dozen Each	£1. 6. 0. £0 3. 8.	*b*

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

ACCESSORIES

FS-760	**Heating block,** fused alumina, with recesses for one heating cell FS-762 and thermocouples.	Each	£5. 2. 10.	*m*
FS-761	**Cover,** fused alumina, for heating block.	Each	£1. 11. 6.	*m*
FS-762	**Heating cell,** fused alumina with partition to separate inert standard and sample	Each	£1. 14. 8.	*m*
FS-763	**Refractory plug,** fused alumina ...	Each	£3. 1. 5.	*m*
FS-764	**Differential thermocouple,** platinum:13% rhodium platinum	Each	£3. 17. 6.	*m*
FS-256	**Thermocouple,** platinum:13% rhodium platinum, size No. 4 for measuring the inert standard temperature (requires compensating cable PX-334 and indicating pyrometer FS-776)	For prices see entries in List No. sequence.		
PX-099	**Compensating cable,** one used for connecting furnace thermocouple FS-256 No. 1 to controller FS-768 and another for connecting inert standard thermocouple FS-256 No. 4 to indicating pyrometer FS-776			
VB-886	**Apiezon grease W,** for sealing ends and thermocouples to work tube			

FS-768

PROGRAMME CONTROLLER, as specification, to give automatic control of rate of rise in temperature. With two uncut cams graduated in time and temperature, one involute cam for fixed temperature control and silicon controlled rectifier power control unit.

Each **£198. 0. 0.** *m*

FS-770

POTENTIOMETRIC RECORDER, range 10–0–10 mV for differential temperature, with event marker, chart width 15 cm chart speed 15 cm/hr. Each **£183. 0. 0.** *fN*

REPLACEMENT PART

FS-771	**Chart,** for FS-770	Roll	£0. 15. 6.	*fN*

FS-772

AMPLIFIER, d.c. with ranges ×1, ×10, ×100 and ×1000, for differential thermocouple signal.

Each **£142 .0. 0.** *fN*

FS-774

POTENTIOMETER, switched, to sub-divide ranges of amplifier FS-772. Complete in case. Each **£16. 0. 0.** *mN*

FS-776

INDICATING PYROMETER, 16 cm scale, for platinum:13% rhodium platinum thermocouples, with contacts to provide calibrating signals to event marker on FS-770 at 300, 600 and 900°C ... Each **£82. 0. 0.** *fN*

When ordering electrical accessories please state voltage and nature of electrical supply.

FS-790

DTA PUNCHED CARD INDEX, *Scifax,* for the rapid identification of components from results obtained by differential thermal analyses. The cards are supplied with data and references, and space is available for further information to be entered by the user. They are arranged in three sections covering mineral, inorganic and organic substances respectively. The sections are coloured and the cards in them are arranged alphabetically; they are supplied ready slotted, however, for rearrangement on the basis of peak coding to reduce the number to be examined at any one time. Provision is made for further slotting of each card according to chemical composition (for this purpose the Hey classification is quoted for each mineral), or according to source of supply, price details or other special information. Supplementary sets of cards are issued periodically. The index comprises over 1600 cards (10·5 × 15·5 cm) in a stout cardboard box 45 × 16 × 13 cm, weight 7·2 kg. Complete with comprehensive explanatory booklet and two 30 cm sorting needles.

Each **£55. 0. 0.** *fN*

Items on this page normally available from stock except those coded *N*.

Gallenkamp CARIUS LOW TEMPERATURE FURNACE, 300°C

FOR DETERMINATIONS OF SULPHUR AND HALOGENS

The case is constructed of asbestolite panels and fitted with a hinged front cover which is secured by a screw clamp. The heating chamber, which has double walls filled in with fibreglass insulation, is heated by elements distributed along the sides and bottom. This gives uniform temperature distribution along four steel tubes placed longitudinally in the furnace. These tubes, which are open at both ends, contain smaller steel tubes, also open ended, into which the glass reaction tubes are inserted. The inner tubes are intended to be plugged with glass wool. A perforated metal box covers the rear ends of the tubes. Both this box and the door are filled with glass wool which reduces the effect should a glass tube burst. The furnace temperature is controlled by an energy regulator and a thermometer pocket is provided.

The Carius reaction is well known to be a hazardous one and suitable precautions must be taken to minimise the risk of injury to personnel.

FS-900

DIMENSIONS

Outer steel tubes	35 mm dia. × 68·5 mm
Inner steel tubes	29 mm dia. × 69 mm
Overall	41 × 28 × 75 cm
Base	28 × 67·5 cm
Weight, net	32 kg
Maximum power rating	1 kW

FS-900

CARIUS FURNACE, *Gallenkamp*, with energy regulator, on/off switch and indicator light. For single phase a.c. supplies. **Without thermometer.**

For 220/240V	Each	**£99. 0. 0.**	*b*
For 200/210V	Each	**£99. 0. 0.**	*bN*
For 110/120V	Each	**£109. 10. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PART

FS-905	**Heating elements**	**Set £1. 7. 0.**	*b*

When ordering replacement parts please state serial number of furnace and voltage and nature of electricity supply.

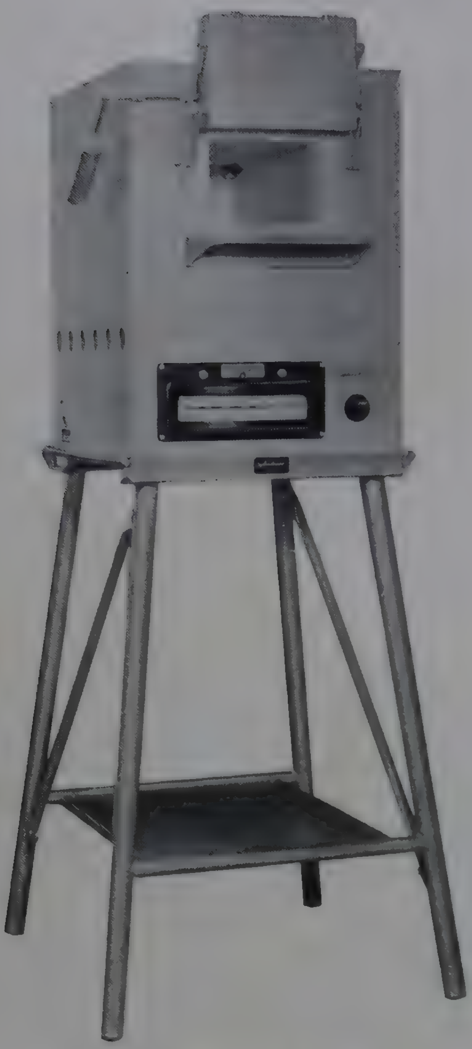
ACCESSORIES

TW-430	**Carius tube ... ...**	For prices see entries in List No. sequence.
TJ-060	**Thermometer 0–360°C ...**	

Items on this page normally available from stock except those coded *N*.

Gallenkamp FURNACE STANDS

A range of rigid tubular steel floor stands designed to provide a comfortable working height for furnaces. The top support frame of each stand is designed to fit the base of one furnace from the *Gallenkamp* range as indicated in the tabulation below. A large undershelf is provided for tools, gloves, etc. The stands can be used as high temperature work tables by the addition of asbestolite top panels listed opposite.



FR-572 with FS-922

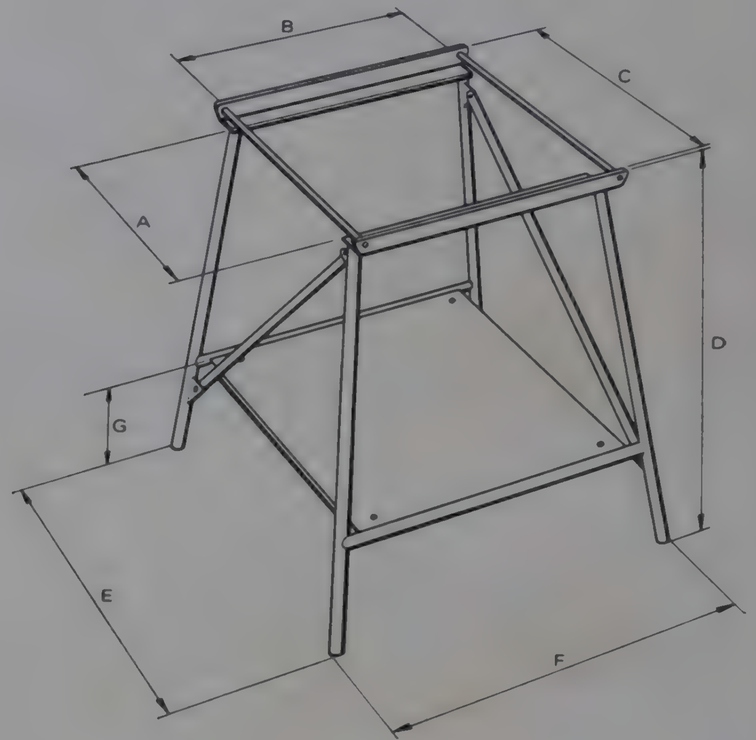


Fig. 1

STANDS

List No.	Suitable for		Dimensions (refer to Fig. 1)							
			A	B†	C†	D	E	F	G	Each
FS-920	FR-550	No. 1	19 7½	45 17¾	33·5 13¼	88 34¾	49 19¼	61·5 24¼	25 cm 10 in	**£20.10. 0.** *b*
FS-922	to	No. 2	35 13¾	45 17¾	49·5 19½	88 34¾	64·5 25½	61·5 24¼	25 cm 10 in	**£21. 0. 0.** *b*
FS-924	FR-574	No. 3	43 17	49 19¼	57·5 22¾	88 34¾	73 28¾	65·5 25¾	25 cm 10 in	**£21.10. 0.** *b*
FS-930	FR-655		40·5 16	46·5 18¼	55 21¾	88 34¾	70·5 27¾	63·0 24¾	25 cm 10 in	**£21.10. 0.** *b*
FS-935	FR-720 and FS-350		28 11	51·5 20¼	42·5 16¾	88 34¾	57·5 22¾	68 26¾	25 cm 10 in	**£21.10. 0.** *b*
FS-940	FR-740	No. 1	40·5 16	54 21¼	55 21¾	88 34¾	70·5 27¾	70·5 27¾	25 cm 10 in	**£21.10. 0.** *b*
FS-942	FR-740	No. 2	48 19	61·5 24¼	62·5 24¾	88 34¾	78 30¾	78 30¾	25 cm 10 in	**£22.10. 0.** *b*

† inside dimensions.

ACCESSORY

FS-946 Castors, ball-bearing type with nylon wheels. Fit all above stands ... ... Set of 4 £6. 5. 0. c

All items on this page normally available from stock.

Gallenkamp FURNACE STANDS

PLATFORM FOR FURNACE STANDS

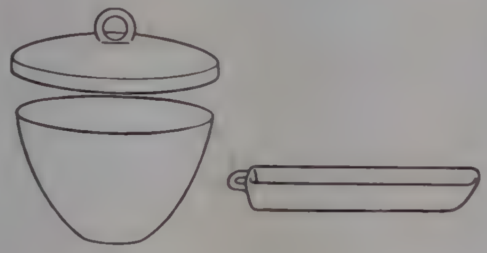
A range of load bearing asbestolite platforms 32 mm thick which can be used to convert furnace stands into work tables suitable for high temperature use.

List No.	To suit stand List No.	Dimensions	Each	
FS-950	FS-920	33 × 44·5 cm 13⅛ × 17⅝ in	£3. 6. 0.	*b*
FS-952	FS-922	49 × 44·5 cm 19⅜ × 17⅝ in	£4. 10. 0.	*b*
FS-954	FS-924	57·5 × 48·5 cm 22⅝ × 19⅛ in	£5. 10. 0.	*b*
FS-956	FS-930	55 × 46 cm 21⅝ × 18⅛ in	£5. 0. 0.	*b*
FS-958	FS-935	42 × 51 cm 16⅝ × 20⅛ in	£4. 8. 0.	*b*
FS-960	FS-940	55 × 53·5 cm 21⅝ × 21⅛ in	£5. 14. 0.	*b*
FS-962	FS-942	62·5 × 61 cm 24⅝ × 24⅛ in	£7. 5. 0.	*b*

Gallenkamp

ACCESSORIES FOR SAMPLE HANDLING

- To contain particulate samples in muffle and tube furnaces.

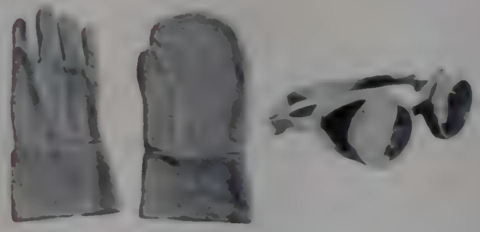


CRUCIBLES and LIDS see pages 172/3
BOATS see page 71

- For large samples and piece parts in muffle furnaces.

TONGS see pages 770/771
TRAYS see page 775

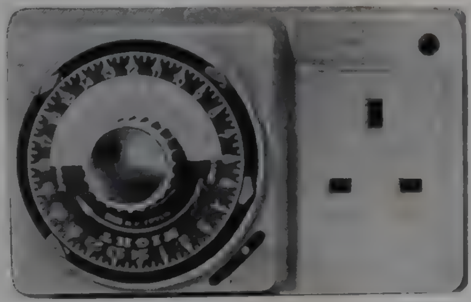
- For operator protection.



GLOVES see pages 155/156
GOGGLES see pages 156/157

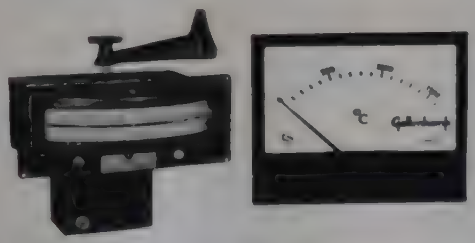
ACCESSORIES FOR FURNACE OPERATION

- For remotely switching furnace supplies ON or OFF.



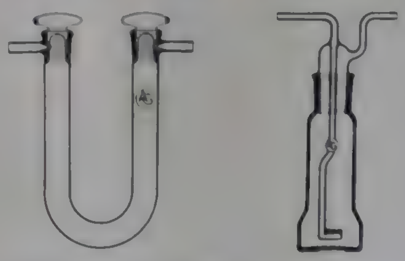
TIME SWITCHES see page 769.

- For temperature measurement and control.



OPTICAL and ELECTRICAL PYROMETERS see pages 634 to 636
PYROMETER CONTROLLERS see page 635

- For gas scrubbing and absorption.



ABSORPTION TUBES see pages 16 to 18
GAS WASHBOTTLES see pages 391/2

All items on this page normally available from stock.

GAS FIRED FURNACES

FT-110 and FT-112

FT-110

FURNACE, CRUCIBLE, Davies. Used with a suitable Bunsen burner, this small furnace attains a temperature of 1000°C which is ideal for the reduction, fusion and melting of many metals and alloys. It may also be used for incineration. When out of use as a furnace it will replace an ordinary tripod with the additional advantage that it functions as a flame protector. The furnace comprises a fireclay body insulated with asbestos and contained in a sheet metal jacket which is supported on three braced feet. Suitable for porcelain crucibles of 30 to 46 mm diameter. **Without burner** ... Each **£4. 2. 0.** *b*

FT-112

FURNACE, CRUCIBLE, Davies, as FT-110 but medium size suitable for porcelain crucibles of 56 to 81 mm diameter. **Without burner.** Each **£6. 0. 0.** *b*

For suitable **crucibles**—see CW-210 et seq. in List No. sequence.

For suitable **burners**—see BX-020, BX-045 in List No. sequence.

FT-150

FT-150

FURNACE, CRUCIBLE, for temperatures up to 1100°C using a Bunsen burner FT-152. Comprises a semi-insulating refractory body of very low heat capacity supported by a metal jacket which is mounted on a rigid platform. Three solid projecting fins locate the crucible in the heating chamber and a lid of the same refractory material is provided with ribs on the underside to allow the escape of hot gases. Maximum crucible size 38 mm dia. Each **£9. 0. 0.** *f*

ACCESSORIES

FT-152 **Burner, Bunsen,** for use with furnace FT-150. Each **£2. 17. 6.** *f*

For suitable **crucibles**—see CW-210 et seq. in List No. sequence.

FT-170

FT-170

FURNACE, CRUCIBLE, concentric jet pattern, with built-in refractory crucible, *Fletcher*, for temperatures up to about 1500°C using town gas and compressed air at 2 lb/in². Owing to the special properties of the refractory lining, high temperatures are rapidly attained. The flame is directed tangentially between the lining and the crucible to eliminate cold spots.

Crucible, internal dimensions	100×75	145×100 mm	
Each	**£15. 0. 0.**	**£21. 7. 6.**	*m*

For suitable **crucibles**—see CW-210 et seq. in List No. sequence.

All items on this page normally available from stock.

LABORATORY FURNITURE AND FITTINGS

INTRODUCTION

This section provides a brief guide to the furniture and fittings required in a modern laboratory. It contains general information of the types of furniture we supply, but customers contemplating new installations or proposing to extend existing facilities are requested to apply for the detailed catalogue 'Laboratory Furniture and Fittings'. The unit equipment we have supplied for many years has been further developed to accommodate recent design trends, and timber, plastics-faced and metal furniture are available. Standard furniture units are manufactured in six main styles of finish, each being obtainable with minor variations to suit six alternative types of bench assembly. This offers thirty-six alternative approaches to every design exercise. It will be seen from the illustrations that we have maintained the clean contemporary lines which have distinguished our furniture for many years.

We offer consultation on all matters concerning laboratory design and will assist gladly in the selection of furniture and equipment to suit particular needs. Customers are invited to call at our showroom, or we can arrange technical representation to meet their convenience.

In addition to the finishes and bench assembly methods listed, we can also supply purpose-made benches and fittings to suit individual requirements.

FURNITURE : STYLES OF FINISH

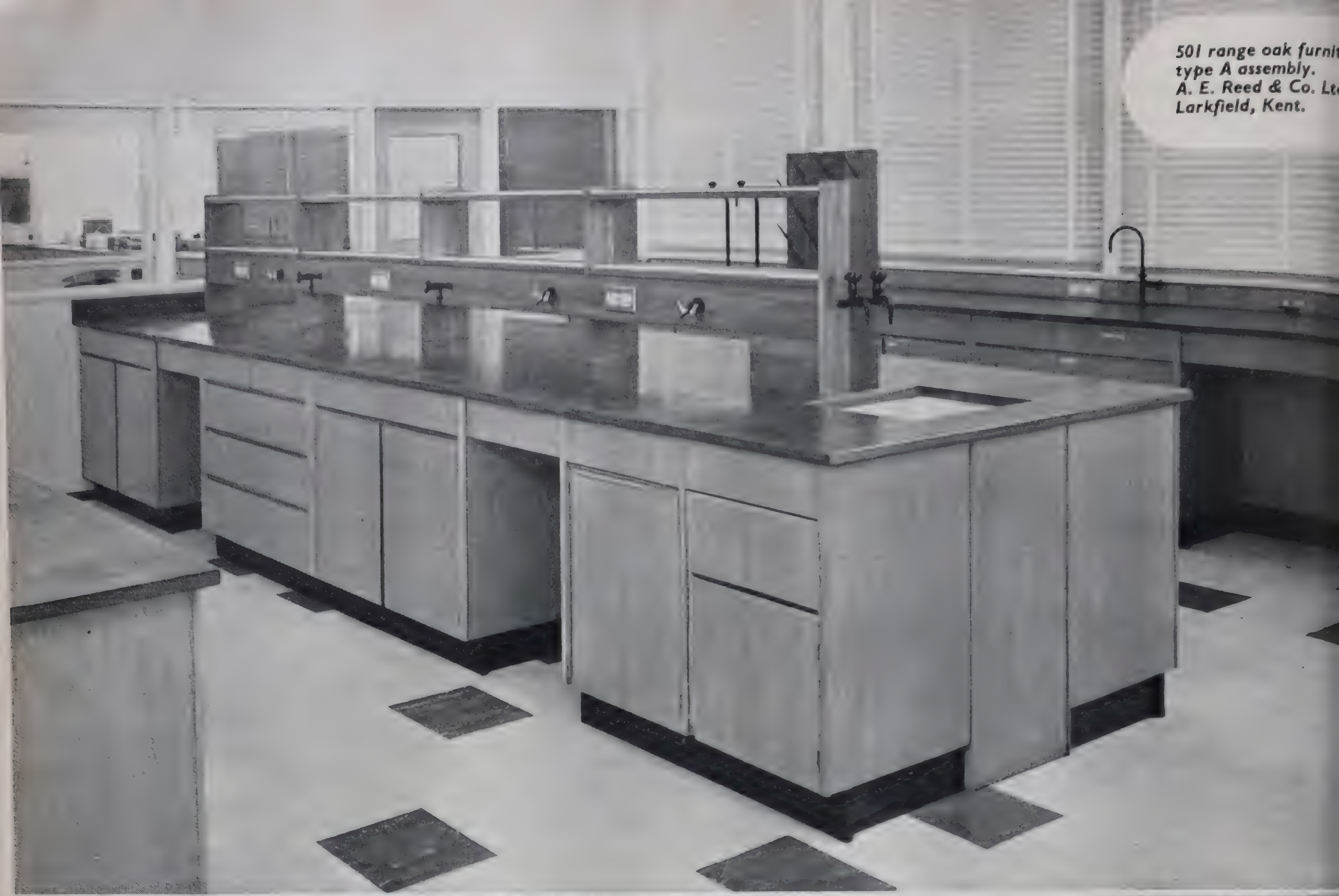
Standard bench units are available to suit any budget, purpose and decor. Furniture finished in oak can be supplied at three price levels; mahogany, aluminium, plastics-faced and teak 'tropical' ranges complete the list from which selection may be made. A general description is given on page 334.

FURNITURE : TYPES OF BENCH ASSEMBLIES

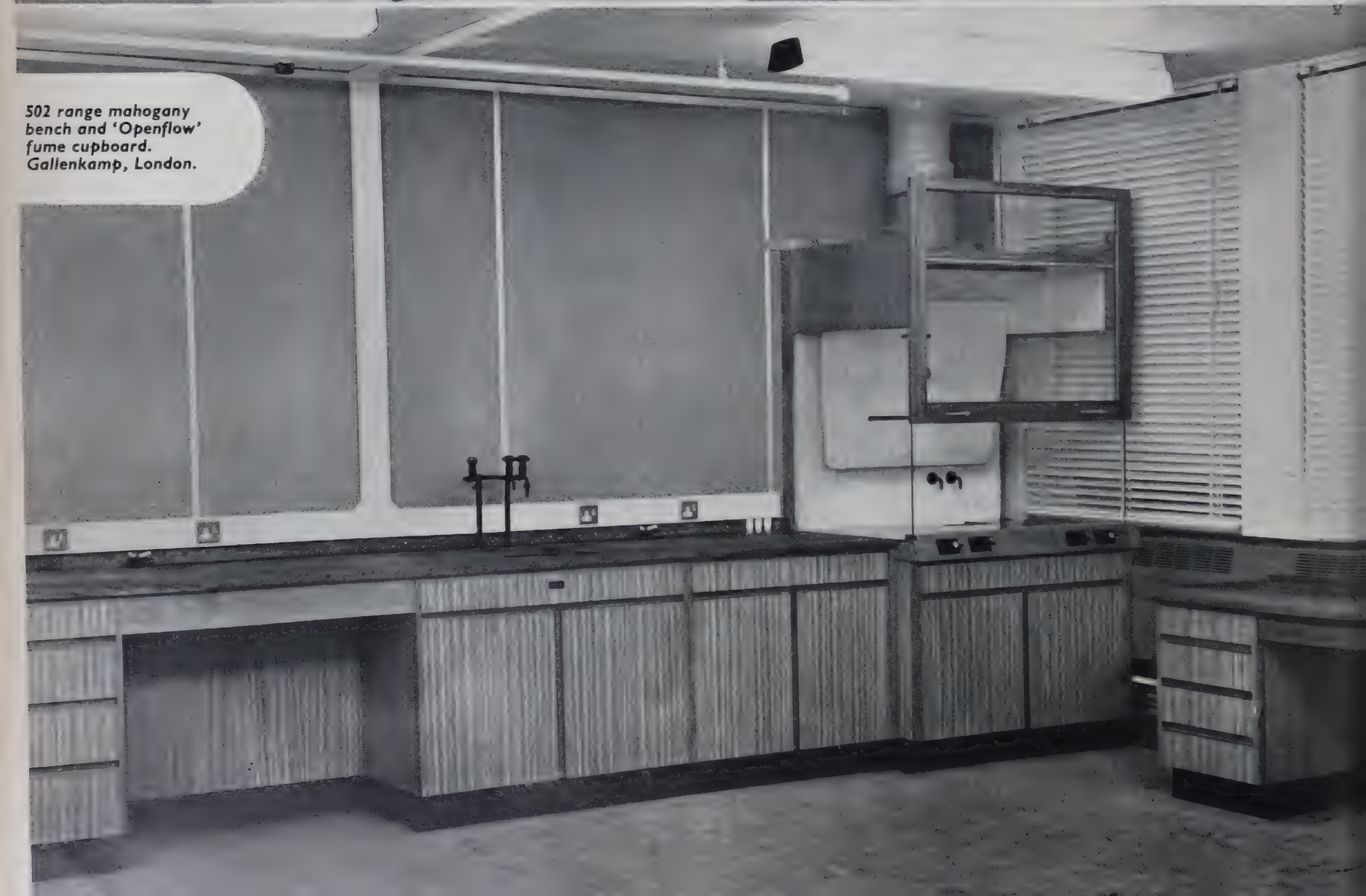
Much emphasis is now placed on flexibility of furniture layout and on page 335 it is shown that we supply benches of the static or fully mobile type with varying degrees of mobility between the two extremes. Standard bench units are used for all these applications, with only minor variations to suit whichever type of bench assembly is selected. Although there is a wide choice in unit finishes and types of assembly, we employ quantity production methods throughout and this results in reasonable prices for high grade workmanship and materials.

FUME CUPBOARDS AND EXTRACTION EQUIPMENT

Fume cupboards, exhaust fans and ducting are illustrated on pages 344 to 353. Customers interested in this equipment are asked to contact our Laboratory Furniture Division and request the separate literature which is available. Nowadays it is recognised that extraction equipment is one of the most important features in chemical laboratories. Our current range of controlled and balanced draught fume cupboards are highly resistant to corrosion and easily cleaned and decontaminated. While using the more advanced units it is not necessary to have the sash lowered to retain fumes and suitably glazed it can be regarded purely as a safety screen. We are proud of our achievements in this field and customers are invited to approach us with their problems.



501 range oak furnit
type A assembly.
A. E. Reed & Co. Lt
Larkfield, Kent.



502 range mahogany bench and 'Openflow' fume cupboard.
Gallenkamp, London.

CONTENTS OF FURNITURE SECTION

		PAGE
BENCHES	Summary of standard units and assembly types.	334/335
DESIGN	'If you are planning new laboratories'.	333
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DRAINING EQUIPMENT	Draining racks and splashbacks.	372
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LABORATORY ACCESSORIES	Blackboards, clocks, small wall safes for storage of precious metals.	372/373
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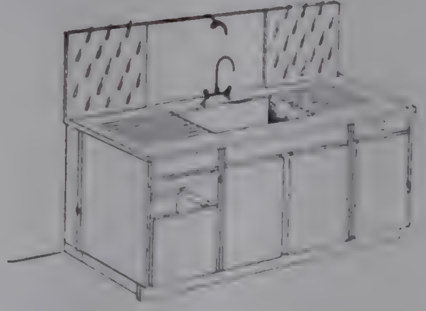
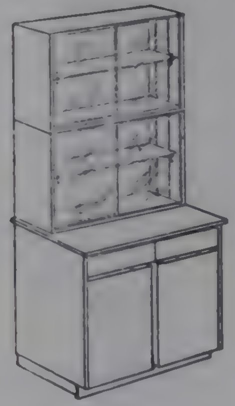
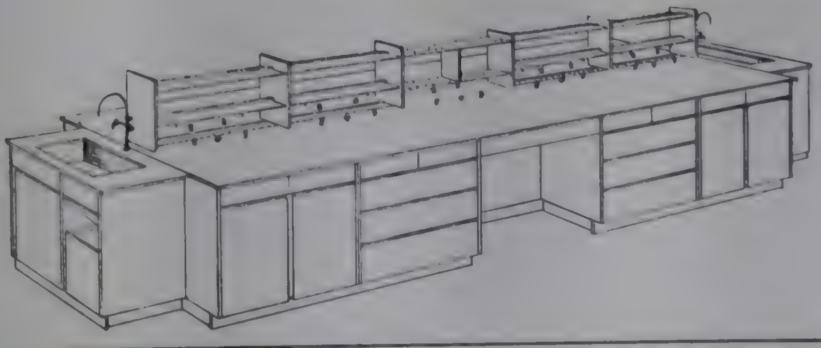
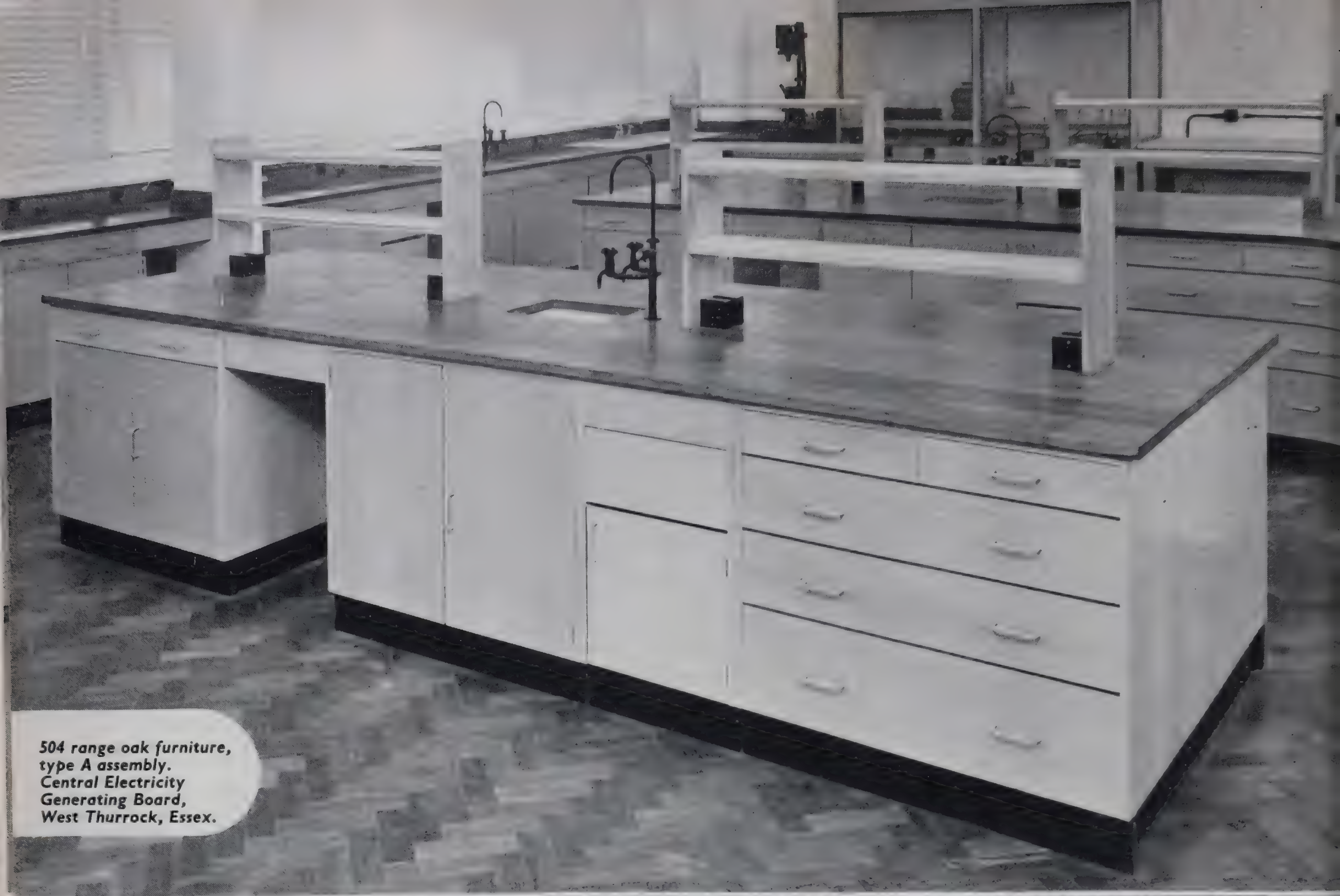
ASK FOR CATALOGUE 'LABORATORY FURNITURE AND FITTINGS' FOR DETAILS OF FUME CUPBOARDS, APPARATUS CUPBOARDS AND BENCHES FOR EVERY BRANCH OF SCIENCE.

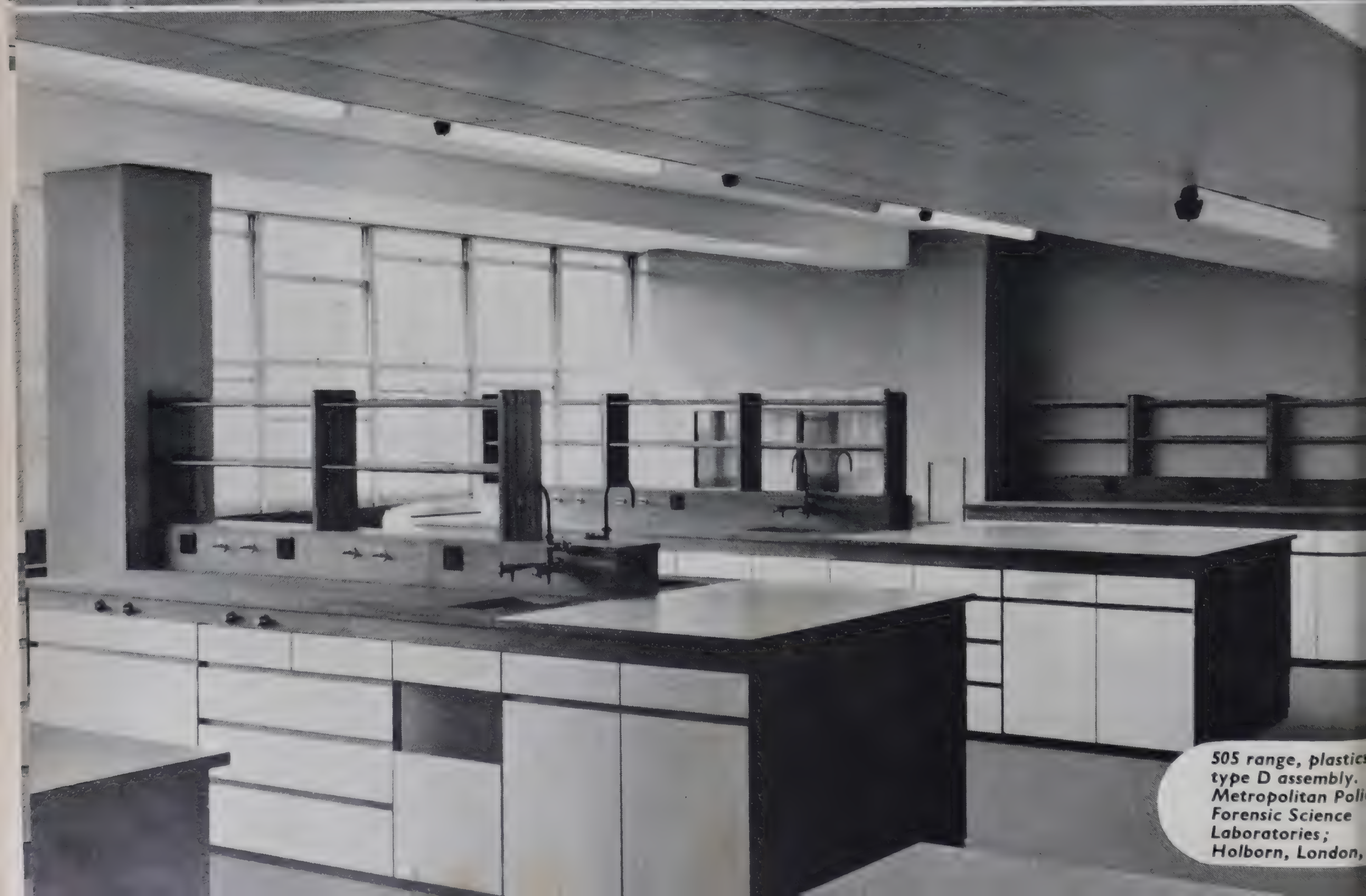








504 range oak furniture, type A assembly. Central Electricity Generating Board, West Thurrock, Essex.



505 range, plastic
type D assembly.
Metropolitan Poli
Forensic Science
Laboratories;
Holborn, London,

IF YOU ARE PLANNING NEW LABORATORIES

a Gallenkamp negotiated contract will provide Free Specialist Consultancy

YOU WILL WANT TO KNOW—

Will the furniture suit the apparatus which will be used?

How much space is necessary for each worker and operation?

What are optimum gangway sizes?

How will instrumentation affect space requirements?

Should metal, plastics faced, or timber benches be specified?

Should an open, bay or enclosed plan be adopted?

What are the best materials for benches, services, fume cupboards and exhaust equipment?

Can a laboratory be comprehensively furnished when funds are limited?

Should benches be static, semi-fixed or fully mobile?

What is the best form of space heating in a laboratory?

What should be the sizes of the mains and the diversity factor for each service?

Are heavy duty fume cupboards available for open sash working?

How effectively is conditioned air conserved by balanced-draught fume cupboards?

How should decor be planned?

Can the entire layout be altered, in say a year's time, at small expense?

ASK FOR SEPARATE CATALOGUE 'LABORATORY FURNITURE AND FITTINGS' FOR DETAILS OF FUME CUPBOARDS, APPARATUS CUPBOARDS AND BENCHES FOR EVERY BRANCH OF SCIENCE.

These questions are illustrative of the many which confront the laboratory designer. No attempt is made here to provide the answers but clients who would like our views on these and similar points are invited to get in touch with the *Gallenkamp* Laboratory Furniture Division.

Not so many years ago it was popularly held that a laboratory project was a simple exercise in joinery, but today it is recognised that the co-ordinated efforts of several specialist designers are necessary if the resulting installation is to be really efficient. Scientists and architects are able to obtain such consultancy at all stages, without charge, by specifying *Gallenkamp* as the nominated contractor. The service includes pre-planning discussions and the preparation of drawings, specification and costs, together with liaison with allied contractors.

Examine the implications of such an arrangement. The advantage of having a team of specialist designers available is obvious. On the other hand users may feel they are losing the main benefit of competitive tendering—that of accepting the lowest price out of a number of offers. Whilst this is true it is also a fact that *Gallenkamp* frequently enjoy success in competitive tendering by reason of low price and unsuccessful bids are rarely more than a marginal amount above the lowest. It makes no difference whether estimates are competitive or in respect of a negotiated contract—quality and quoted prices do not vary. Thus the user is assured that the negotiated contract will be carried out at a reasonable price, and in return the *Gallenkamp* Laboratory Furniture Division uses its full resources to ensure that the installation is successful in all respects. This company has a long term interest as a supplier to the user and the combination of scientist, architect and nominated contractor is ideal. Projects tackled in this way are certainly among the more successful.

Where competitive tendering is considered necessary, *Gallenkamp* offer a useful service. Catalogues of benches, fume cupboards and ancillary equipment of many types are available to assist users in the preparation of their specification and drawings, and there are representatives to discuss the details of a scheme before tenders are invited. It is particularly important that the specification sent out to tenderers should be complete in all details as otherwise the user is faced with an extremely difficult task when adjudicating the offers. We have known laboratories spoiled by points in the specification being misinterpreted by lay manufacturers, mistakes not realised until the contract had been awarded purely on the basis of the lowest estimated price. By the time such discrepancies are adjusted the final contract price is possibly by no means the lowest. A correctly framed specification will avoid such trouble.

Gallenkamp welcome competitive enquiries but commend the Negotiated Contract system as being particularly worthy of consideration. Only in this way can the accumulated knowledge and experience of many and diverse specialist designers, working with the user and his advisers, be brought fully to bear.

This is an approach too important to be ignored!

Why not investigate it with us?

Gallenkamp STANDARD BENCH UNITS

All *Gallenkamp* bench units are attractively styled and incorporate the best features of modern practice. In all timber faced units the veneers are carefully matched to ensure continuity of grain and have exposed faces finished in natural colour matt polished. Large scale production methods enable each range to be marketed at competitive prices. Many units are fitted with removable backs for access to service runs.

501

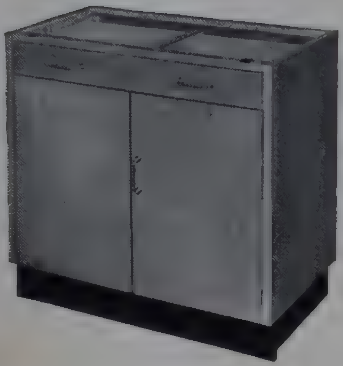
501 Range: Oak finish

These units are constructed with blockboard ends, chipboard doors and multi-ply drawer fronts, all finished with matched oak veneers having continuous vertical grain. Drawer sides and backs are of hardwood, with all joints dovetailed. Drawer and cupboard bottoms are of heavy quality plywood. Features of these units are the recessed drawer and door pulls and butting profiles. Units fitted with ebonised plinths.

502

502 Range: Mahogany finish

Similar to the 501 Range, but constructed with chipboard ends and doors and multi-ply drawer fronts. Veneered in Sapele mahogany to give a continuous vertical grain. Drawer sides and backs of hardwood, with all joints dovetailed. Drawer and cupboard bottoms of plywood. Finished in natural mahogany colour, matt polished with ebonised plinths. Unit backs of hardboard. **Can be supplied with an Oak finish, giving a similar appearance to the 501 Range, but at reduced cost.**


504

504 Range: Oak finish

Designed specifically to enable a laboratory to be comprehensively equipped on a limited budget. High quality chipboard is used for ends and doors, with multi-ply drawer fronts veneered in oak. Drawer and cupboard bottoms of plywood: removable backs of hardboard. 'D' type polished aluminium drawer and door pulls, plinths are of ebonised softwood.

505

505 Range: Plastics faced

Decorative appearance, yet strictly functional, designed specifically for prestige installations. These units are styled similarly to the 502 Range, but having white Melamine plastics faced drawers and doors. In some instances alternative colours may be chosen to suit the laboratory decor. Recessed door and drawer pulls; ebonised plinths. The units are easily cleaned and are ideally suited to Radioisotope and Bacteriological use.

506

506 Range: Tropical

Designed primarily for export to tropical and termite infested areas. They are constructed with teak framing and recessed panels of plastics sheet. They can, if required, be 'broken down' for economical packing.

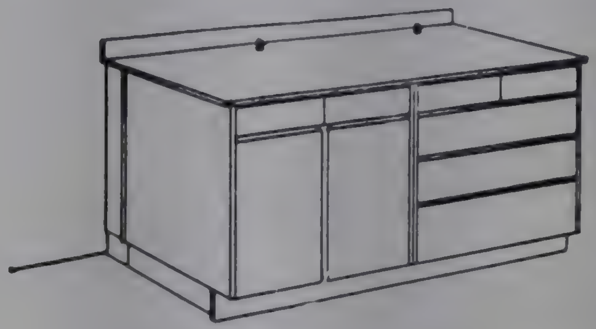
Gallenkamp-Paul **Aluminium and Stainless Steel constructions.** Produced in Association with W. H. Paul Ltd., Breaston, Derbyshire. Based on their celebrated range of '*Paul*' domestic equipment, but modified to meet laboratory conditions. Doors are double skinned and soundproofed, drawer and door pulls are edged with stainless steel and recessed. These units are finished in white gloss stoved enamel with metal plinths.

Examples of these ranges may be viewed at our London Showrooms.

TYPES OF BENCH ASSEMBLY

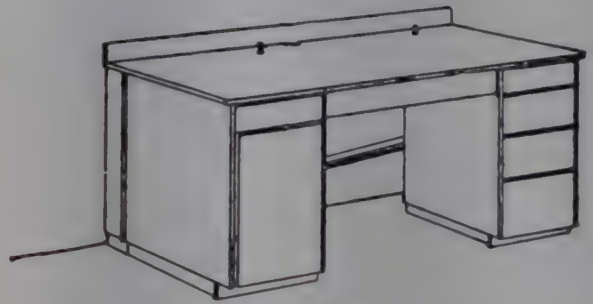
TYPE 'A'

The bench top is mounted directly on to the units, which perform the dual functions of storing apparatus and supporting the bench top. Working height is 3 ft. Pipes are mounted either on the walls behind bench units or on the units themselves; in the case of island benches they are run in the service space at the centre. This is the most economical form of bench construction.


TYPE 'A'

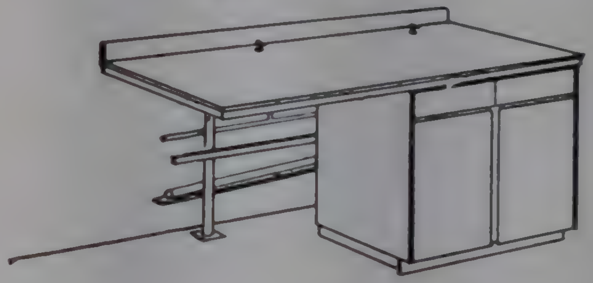
TYPE 'B'

The bench top is mounted directly on to the units, as in type 'A'. The working height is 2 ft 9 in or 2 ft 10 in, as specified. Pipe runs are accommodated exactly as for type 'A' benches.


TYPE 'B'

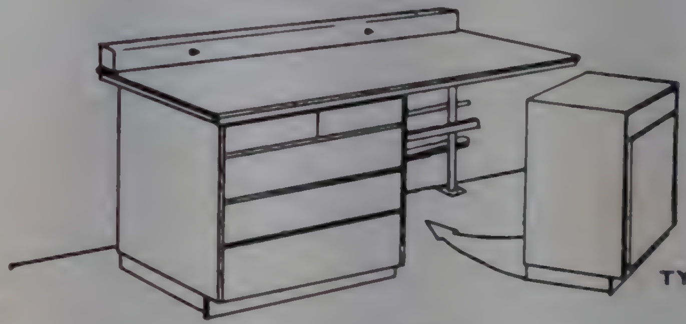
TYPE 'C'

The bench top is mounted independently of the units by means of floor stands provided with integral cantilever brackets. The working height is 3 ft. Bench units can easily be rearranged to suit changing requirements and all units are provided with height adjusters and dust covers. A continuous rail beneath the bench top provides space for mounting remote control taps and electric sockets. Pipe runs are mounted on special brackets which are available for fixing to the floor stands.


TYPE 'C'

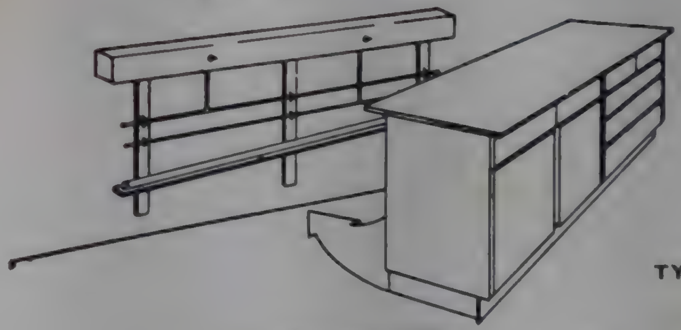
TYPE 'D'

The bench top is mounted in a manner similar to type 'C' but there is the addition of a horizontal service box at the rear. This is particularly useful where bench top cleanliness is a criterion as it is unencumbered by service taps, which are mounted on the riser of the service box. Underbench units are fitted with height adjusters and dust covers.


TYPE 'D'

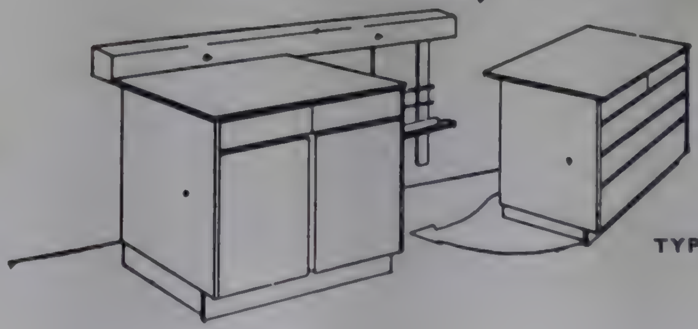
TYPE 'E'

The bench top is mounted directly on to the units but is quite separate from the service box, which runs horizontally at the rear of the bench or at the centre in the case of an island bench. The removable bench can be made to any desired length, but it is usual not to exceed 9 ft. Working height is 3 ft. Plumbing runs are fixed to the supporting frame assembly which, in the case of a wall bench, is in turn fixed to the wall. For an island bench it is self supporting. Should access be required to the plumbing it is a simple matter to remove the entire bench to expose the services. Underbench units are fitted with height adjusters and dust covers.


TYPE 'E'

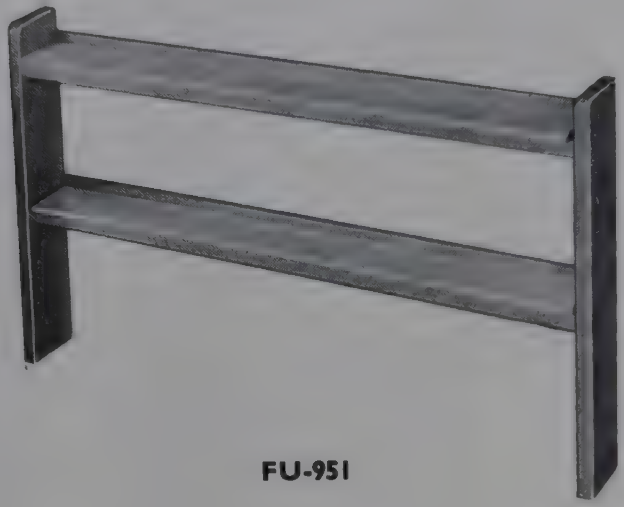
TYPE 'F'

The sectional bench top is quite separate from the service box. Each bench unit is provided with an integral and separate working top. Sections are butted one to another with sealing strips. Working height is 3 ft. A bench so assembled can be rearranged with little effort. Underbench units are fitted with height adjusters. Bench sections may be removed to give service space to floor standing apparatus.


TYPE 'F'

REAGENT BOTTLE SHELVES

For mounting on bench tops, constructed throughout in oak and having white technolite strips, ¼ in thick laid on the shelves to facilitate cleaning.



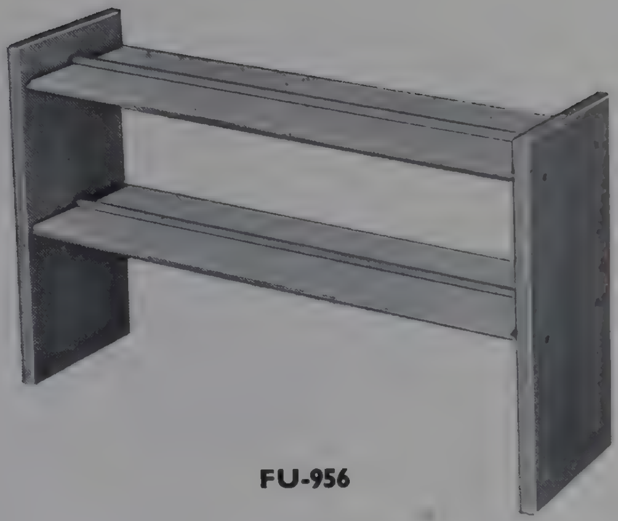
FU-951

For wall benches, shelves are 4½ in deep × 1 ft 9 in high overall giving 9 in clear height between the bench top and the first shelf, and 8½ in clear between shelves.

FU-950
REAGENT BOTTLE SHELF, wall fitting, 1 ft 6 in wide, with two rectangular ends ... ... Each **£5.10. 0.** *f*

FU-951
REAGENT BOTTLE SHELF, wall fitting, 3 ft wide, with two rectangular ends ... ... Each **£8.10. 0.** *f*

FU-952
REAGENT BOTTLE SHELF, wall fitting, 6 ft wide, with two rectangular ends and one centre division. Each **£14.10. 0.** *f*



FU-956

For island benches, shelves are 9 in deep × 1 ft 9 in high overall and fitted with dividing beads at the centre of the shelves. The heights between shelves are identical with the wall type.

FU-955
REAGENT BOTTLE SHELF, island fitting, 1 ft 6 in wide, with two rectangular ends ... Each **£8. 0. 0.** *f*

FU-956
REAGENT BOTTLE SHELF, island fitting, 3 ft wide, with two rectangular ends ... ... Each **£11. 2. 6.** *f*

FU-957
REAGENT BOTTLE SHELF, island fitting, 6 ft wide, with two rectangular ends and one centre division. Each **£15.18. 0.** *f*

FV-264

STORAGE CABINETS. Robust enamelled steel cabinets with strong transparent plastics drawers for visible storage of small articles. Drawers have label holders and stop to prevent accidental over pulling. Overall dimensions 43 cm high, 31 cm wide, 14·5 cm deep. All sizes of drawer are 13·5 cm front to back.

List No.	No. of drawers		Size of drawers, cm	
			Width	Height
***FV-260**	36		6·5	3·5
***FV-262**	18		8·6	5·7
***FV-264**	20	10	6·5	3·5
		5	13·5	3·5
		3	8·6	5·7
		1	27·5	3·5
		1	27·5	5·7

For prices see entries in List No. sequence.

REFRIGERATORS

For under bench and wall fixing

FU-995

REFRIGERATOR, *Electrolux*, 1 ft 8⅜ in wide × 1 ft 9¼ in deep × 2 ft 6¾ in high. Suitable for fixing below a bench top of 3 ft working height. The unit has an internal volume of 2·8 ft^3 and is fitted with three internal shelves, freezing compartment, ice tray, also additional storage space at rear of door. Electrically operated. See Note below ... ... Each **£38. 8. 7.** *f*

FU-996

REFRIGERATOR, *Electrolux*, 1 ft 9¾ in wide × 1 ft 11 in deep × 2 ft 10$\frac{13}{16}$ in. Suitable for fixing below a bench top of 3 ft working height. The unit has an internal volume of 4 ft^3 and is fitted with three internal shelves, freezing compartment, ice trays, also additional storage space at rear of door. Electrically operated. See Note below. Each **£44.16. 8.** *f*

FU-998

REFRIGERATOR, *Electrolux*, 1 ft 8⅛ in wide × 1 ft 7¼ in deep × 2 ft 4⅜ in high. Suitable for fixing below bench tops as type B, C and D. The unit has an internal volume of 1·6 ft^3 and is fitted with two removable shelves and an ice tray, with additional storage space at rear of door. Electrically operated. See Note below. Each **£27. 4. 5.** *f*

When ordering please state voltage and nature of supply

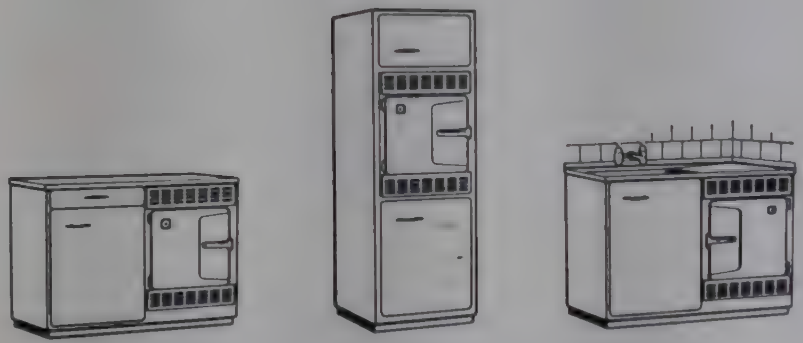
FU-999

REFRIGERATOR, *Electrolux*, as FU-998, but town gas operated. See Note below ... Each **£27. 4. 5.** *f*

FU-995

NOTE: FU-995 to FU-999 are supplied finished in either white or cream and with right or left-hand hinged doors. **Please state preference when ordering.**

Other types of refrigerators, including free standing and low temperature models, see RJ-610 et seq. under REFRIGERATION.



Illustrating *Electrolux* refrigerators in typical underbench and cupboard installations. Details sent on request.

Gallenkamp TITRATION BENCHES

FV-214

FV-215

FV-218

VACUUM FILLING

- **Press-button operation**
- **Mounts six automatic zero burettes**
- **Stock solutions are accommodated in the cupboard avoiding deterioration through exposure to light**
- **Vacuum filling ensures no impurities are introduced to solutions**

FV-214

TITRATION BENCH, auto zero, for vacuum operation, 3 ft 6 in wide × 1 ft 9 in deep × 5 ft 11⅜ in high. White technolite back, framed between two ends. White technolite top, 2 ft 11⅜ in high, set on cupboard unit FU-581 **oak finish.** Top drilled for 6 burette feet and locking rings, which are supplied with press-button valves and label plates, also 6 × 50 cm³ burettes and T-pieces. Without pump, switch, solution bottles or connections.

Each **£91.10. 0.** *f*

REPLACEMENT PARTS

BW-600	Burette, 50 cm³ Class B.	For details and prices see entries in List No. sequence.
BW-602	T-piece	

Sets of solution bottles, glass and plastics connections, sinks or drip funnels, distilled water services and illuminated backs are available and will be quoted on request. The complete titration unit is intended for connection to an existing vacuum line, but if not available a suitable suction pump can be supplied. Please write for details.

GRAVITY FILLING

FV-215

TITRATION BENCH, gravity filling, 3 ft 8 in × 1 ft 10 in × 6 ft 3 in high. White technolite back, framed between two ends with a shelf to accommodate aspirator bottles and a horizontal rod mounting 3 spring clamps, SM-290. White technolite top 3 ft 8 in wide set on cupboard and single drawer unit FU-531 3 ft 6 in wide.

Each **£52.10. 0.** *f*

For full details of FU-531 and FU-581 ask for catalogue **Laboratory Furniture and Fittings.**

FV-218

TITRATION UNIT, illuminated, 3 ft × 1 ft × 3 ft 5 in high. Glass screen illuminated by means of strip lights set in frame, with 2 spring clamps to accommodate 4 burettes. This unit may be mounted on wall or bench top.

Each **£28.12. 6.** *f*

All titration benches specified on this page match 501 range oak furniture. Corresponding units in the 505 plastics faced range are similarly priced. Other furniture ranges can also be matched —prices on application.

Gallenkamp
REGD. TRADE MARK

BALANCE TABLE

BD-200

BD-200

BALANCE TABLE, to provide a working surface which is free from the vibrations inherent in buildings. Ideal for mounting analytical balances, galvanometers, optical levers and other vibration sensitive instruments. The table comprises a set of stone slabs and a set of sundries. The top member and two side members (which are drilled to accept the bracing bar) are of 3 in (8 cm) thick grey/green mottled terrazzo stone. The sundries comprise the bracing bar, washers and nuts, and a set of rubber shock-absorbing pads. Supplied with instructions for assembly.

Overall height 2 ft 6 in (76 cm).
Working surface 3 ft 0 in × 2 ft 6 in (90 × 76 cm).
Net weight 6 cwt (300 kg) approx.
For price see entry in List No. sequence.

LABORATORY DESKS

FV-225

FV-225

DESK, 4 ft × 2 ft 8 in × 2 ft 6 in high. Linoleum top, edged with mahogany. Pedestal on right hand side has pull-out writing flap, two drawers and a cupboard.

Each **£43. 0. 0.** *f*
+ Purchase Tax

FV-226

DESK, 5 ft 9 in × 2 ft 8 in × 2 ft 6 in high. Linoleum top, edged with mahogany. Left hand pedestal contains one pull-out writing flap, one deep drawer and cupboard. Right hand pedestal has one pull-out writing flap, two shallow drawers and foolscap filing drawer. The top overlaps at one end, and there is a substantial knee recess in the back. These features permit several people to use the desk simultaneously for an informal meeting.

Each **£58. 7. 6.** *f*
+ Purchase Tax

FV-226

LABORATORY STOOLS AND CHAIRS

FV-227

FV-228

FV-227

CHAIR, strong taper tube frame. Suitable for microscope and balance work. Seat height 19 in. Upholstered seat and back, covered green PVC... Each **£4.16. 0.** *m*

FV-228

STOOLS, tubular steel, with 13 in dia. seat upholstered and covered green 'Vynide'. Grey stove enamelled finish.

Height	24	27 in	
Each	**£3.18. 0.**	**£3.18. 0.**	*m*

FV-229

STOOLS, tubular steel, with 13 in dia. seat upholstered and covered green 'Vynide'. Chromium plated finish.

Height	24	27 in	
Each	**£6. 0. 0.**	**£6. 0. 0.**	*m*

FV-230

STOOLS, beech frame with hardwood seat, polished to match light oak.

Height	24	27 in	
Each	**£1.12. 6.** + Purchase Tax	**£1.15. 0.** + Purchase Tax	*m*

FV-231

STOOLS, beech frame with padded seat covered with green 'Vynide'. Frame polished to match light oak.

Height	24	27 in	
Each	**£2.19. 0.** + Purchase Tax	**£3. 0. 0.** + Purchase Tax	*m*

FV-230

FV-231

FV-235

FV-235

CHAIRS, tubular steel, enamelled light grey, with black vulcanised fibre seat and back. Legs fitted with plastics end plugs.

Height	18	20	22	24	26	28 in	
Each	**70/-**	**70/-**	**70/-**	**74/-**	**74/-**	**74/-**	*m*

FV-236

CHAIRS, tubular steel, enamelled light grey with black vulcanised fibre seat and back. Models 22 and 25 in have footring and metal floor glides. All models have 5 in screw adjustment.

Height (min)	16	19	22	25 in	
Each	**125/-**	**130/-**	**150/-**	**165/-**	*m*

FV-236

FV-238

FV-238

ARMCHAIR, for desk, square section tubular steel with Du-alized grey finish. Upholstered seat, foam back and arms, covered green Texide ... Each **£17. 0. 0.** *mN*

Items on this page normally available from stock except those coded *N.*

APPARATUS RACKS AND CABINETS

FV-240

RACK, burette, 1 ft 6 in×3 in×10½ in high. Teak. Holds 8×50 cm^3 burettes. Fixed to wall by 2 mirror plates ... ... Each **£2.11. 0.** c

FV-241

RACK, pipette, 1 ft 6 in×3 in×10½ in high. Teak. Holds 14×10 cm^3 and 12×25 cm^3 pipettes. Fixed to wall by 2 mirror plates ... ... Each **£2. 9. 0.** c

FV-242

RACK, thermometer, 1 ft 6 in×3 in×10½ in high. Teak. Holds 36 thermometers. Fixed to wall by 2 mirror plates... ... ... Each **£2. 9. 0.** c

FV-243

RACK, combined burette and pipette, 3 ft×3 in×10½ in high. Teak. Holds 8×50 cm^3 burettes, 14×10 cm^3 and 12×25 cm^3 pipettes. Fixed to wall by 2 mirror plates. Each **£3.18. 0.** c

FV-244

STAND, glass tubing, 2 ft 6 in×6 in×3 ft high. Oak, light polished, with divisions for 10 sizes of tubing. Each **£7.10. 0.** c

FV-245

CABINET, filter paper, 10¾ in×9 in×1 ft 1 in high. Oak, light polished, having interior divided to hold standard filter paper boxes. Fitted with hinged door. Each **£7.10. 0.** c

FV-246

CABINET for graduated glassware, 2 ft 2 in×7 in×3 ft 4 in high. Oak, light polished, with one pair of glazed hinged doors. Interior fitted with racks and clips. White technolite draining plate in bottom. Each **£19. 0. 0.** m

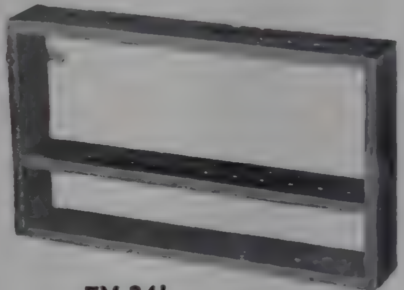
FV-247

STAND, text book, oak, light polished, 1 ft 8 in wide×7 in deep×1 ft high ... ... Each **£2. 1. 0.** m

FV-243

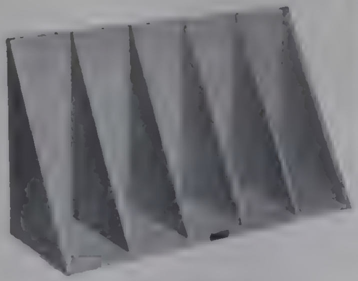
FV-240

FV-244


FV-241
FV-242

FV-245

FV-246


FV-247

All items on this page normally available from stock.

LABORATORY TROLLEYS

FV-250

FV-250

TROLLEY, 3 ft wide × 1 ft 9 in deep × 2 ft 10 in high. Oak, light polished, having two shelves and fitted with four rubber tyred castors ... ... Each **£10. 0. 0.** *m*
+ Purchase Tax

FV-251

TRAYS, 2 ft 8 in wide × 1 ft 6 in deep × 3 in high, oak, light polished, for use with trolley FV-250.
Each **£3. 12. 0.** *m*
+ Purchase Tax

FV-254

FV-254

TROLLEY, 2 ft 7½ in wide × 1 ft 5 in deep × 2 ft 7 in high, rigidly constructed of 16 swg rectangular steel tube. Suitable to meet the varied requirements of a laboratory, including the mounting and transport of portable vacuum pumps. Finished white epoxy stoved enamel and having two removable trays; fitted 4 in heavy duty rubber castors.
Each **£18. 0. 0.** *m*

FV-255

TRAYS, spare, 24¼ in × 14¾ in with 1 in lip all round and two carrying handles, finished white epoxy stoved enamel, for use with trolley FV-254... ... Each **£1. 16. 0.** *m*

FV-256

TROLLEY, 3 ft 3½ in wide × 1 ft 8 in deep × 3 ft ½ in high. Tubular steel construction, stove enamelled, and mounted on 4 in dia. rubber tyred castors. Fitted three removable grey plastics trays ... Each **£28. 10. 0.** *mN*

FV-256

STORAGE CABINETS

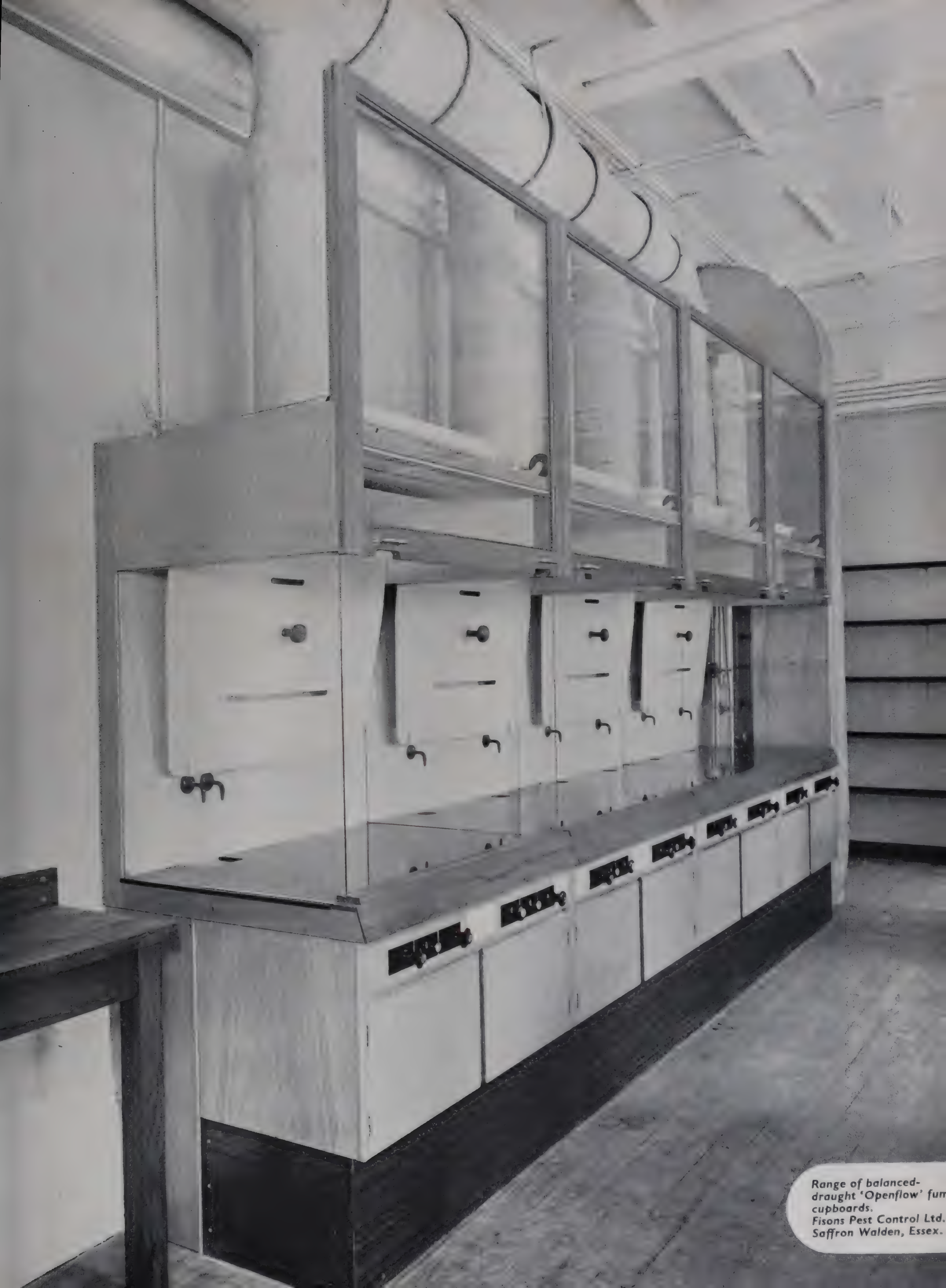
Robust enamelled steel cabinets with strong transparent plastics drawers for visible storage of small articles. Drawers have label holders and stop to prevent accidental over pulling. Overall dimensions 43 cm high, 31 cm wide, 14·5 cm deep. All sizes of drawer are 13·5 cm front to back.

List No.	No. of drawers	Size of drawers, cm		Each	
		Width	Height		
***FV-260**	36	6·5	3·5	**£4. 16. 0.**	*m*
***FV-262**	18	8·6	5·7	**£4. 5. 0.**	*m*
***FV-264**	20 { 10	6·5	3·5	**£4. 13. 6.**	*m*
	5	13·5	3·5		
	3	8·6	5·7		
	1	27·5	3·5		
	1	27·5	5·7		

Other sizes can be supplied. Prices on application.

For illustration see page 336.

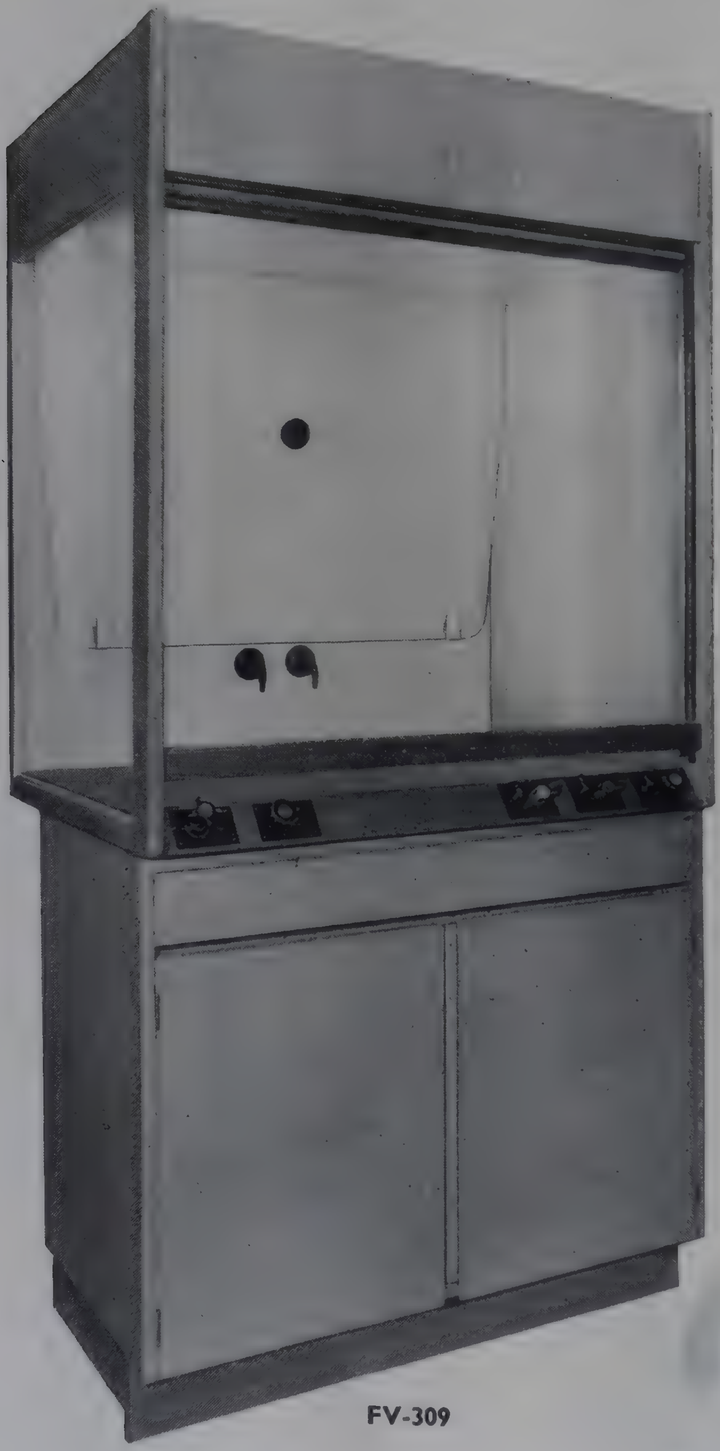
Items on this page normally available from stock except those coded *N.*



Range of balanced-
draught 'Openflow' fum
cupboards.
Fisons Pest Control Ltd.
Saffron Walden, Essex.

Gallenkamp STANDARD FUME CUPBOARDS

- **Clean modern styling**
- **Multiple assemblies can be made up from any number of units**
- **Extract duct opening at top, to accommodate 5 in diameter pipe, unless otherwise specified**
- **Back and roof lined with protective coated asbestolite**



FV-309

Dimensions:
Width 3 ft 6 in. Depth 2 ft 6 in. Height overall 6 ft 11 in. Height to working top 3 ft 1 in.

- **Narrow stiles give excellent view and access**
- **Sash and sides glazed for all-round visibility**
- **Inclined fascia improves air flow and mounts service taps**
- **Standard under-bench unit**
- **Adjustable baffle controls air flow distribution** (This is an optional extra)
- **Black technoplate working top with front lip to protect operator from spillage**

CONSTRUCTION

The carcase is oak framed, the sash frame and inclined fascia are of teak. Only a very small amount of these timbers is exposed inside the cupboard, this practically eliminating fire and corrosion hazards.

COUNTERPOISED SASH

Runs on terylene lines.

STANDARD GLAZING

For sash and ends, 32 oz glass. The back and roof are lined with asbestolite, coated with epoxy resin.

Alternative glazings and linings are available to meet special requirements. Details and prices on application.

SERVICES

Front controlled services may be mounted on the inclined fascia with either integral nozzles, or remote controlled nozzles mounted at the back of the cupboard. Sinks may be fitted in the base, and electrical switches fixed to the top panel of the carcase unit.

OPEN SASH WORKING

When baffle FV-307 is fitted, the sash can be kept raised for many applications. If provided with protective glazing the sash can be regarded as a safety screen.

STANDARD EXTERNAL FINISH

Oak, light polished to match 501, 502 oak and 504 ranges of furniture. Mahogany, for installations where 502 mahogany, 503 aluminium and 505 plastics ranges are used.

ADDITIONAL LIGHTING

Top lighting may be achieved by means of a glazed panel let into the roof and in addition an electric light may be fitted to illuminate through this panel. Prices on application.

MODIFICATIONS to suit specialised needs

Top panels may be extended to ceiling height to enclose ductwork.

Air intake ducts can be fitted to reduce the extraction of conditioned air.

A water cooled baffle can be provided for perchloric acid extraction.

Gallenkamp STANDARD FUME CUPBOARDS

FV-300

FUME HOOD, standard, 3 ft 6 in wide × 2 ft 6 in deep × 4 ft high, for mounting on existing bench top or support. The hood has glazed ends with back and roof of protected asbestolite. Fitted with easily adjusted baffle FV-307 for distributed air flow. Working top of black technoplate. No service fittings are included. ... Each **£71. 10. 0.** *f*

FV-301

FUME CUPBOARD, standard, 3 ft 6 in wide × 2 ft 6 in deep × 4 ft high, for mounting on existing bench top or support. Glazed counter-poised sash and ends with protected asbestolite back and roof. Working top of black technoplate. No service fittings are included.
Each **£60. 5. 0.** *f*

ACCESSORY

FV-307 **Asbestolite baffle,** for fitting to standard fume cupboard FV-301, complete with teak operating handle and hinges. Specially coated for protection against corrosion. Readily dismantled for cleaning. Gives excellent control of air flow and may also be used to cut off the flow of air from any one cupboard in a multiple assembly.
Each **£13. 10. 0.** *f*

FV-309

FUME CUPBOARD, standard, 3 ft 6 in wide × 2 ft 6 in deep × 6 ft 11 in high. Comprises fume cupboard FV-301 with two glazed ends and glazed sash. Fitted with adjustable baffle FV-307. Working top of black technoplate with hole cut for sink. Mounted on cupboard unit FU-581.

Services

1 panel mounting gas tap with integral nozzle FW-110, 1 water tap front control FW-140, 1 steam tap front control FW-141, 1 water bend FW-151, 1 steam bend FW-151, 1 panel mounting compressed air tap with integral nozzle FW-112, 1 panel mounting vacuum tap with integral nozzle FW-111, 1 sink FW-400 8 × 6 × 6 in, 1 plug FW-436 black polythene, 1 pair straps FW-401.
Each **£117. 17. 6.** *f*

FV-310

FUME CUPBOARD, standard, 7 ft wide × 2 ft 6 in deep × 6 ft 11 in high. **Comprises 2 fume cupboards FV-301** with 2 glazed ends and glazed division between mounted on 2 cupboard units FU-581. Two end service panels as FU-751.

Services

4 panel mounting gas taps with integral nozzles FW-110, 2 water taps front control FW-140, 2 water bends FW-151, 2 sinks FW-400, 8 × 6 × 6 in, 2 plugs FW-436 black polythene, 2 pairs straps FW-401, 2 electrical double socket outlets 13 amp ... ... Each **£198. 10. 0.** *f*

FV-311

FUME CUPBOARD, standard, 10 ft 6 in wide × 2 ft 6 in deep × 6 ft 11 in high. **Comprises 3 fume cupboards FV-301** having 2 glazed ends and 2 glazed centre divisions. Mounted on 3 cupboard units FU-581. Two end service panels as FU-751.

Services

4 panel mounting gas taps with integral nozzles FW-110, 2 water taps front control FW-140, 2 water bends FW-151, 2 drip wastes black polythene FW-492, 6 electrical switch sockets 13 amp, 3 switches for lighting.
Each **£322. 10. 0.** *f*

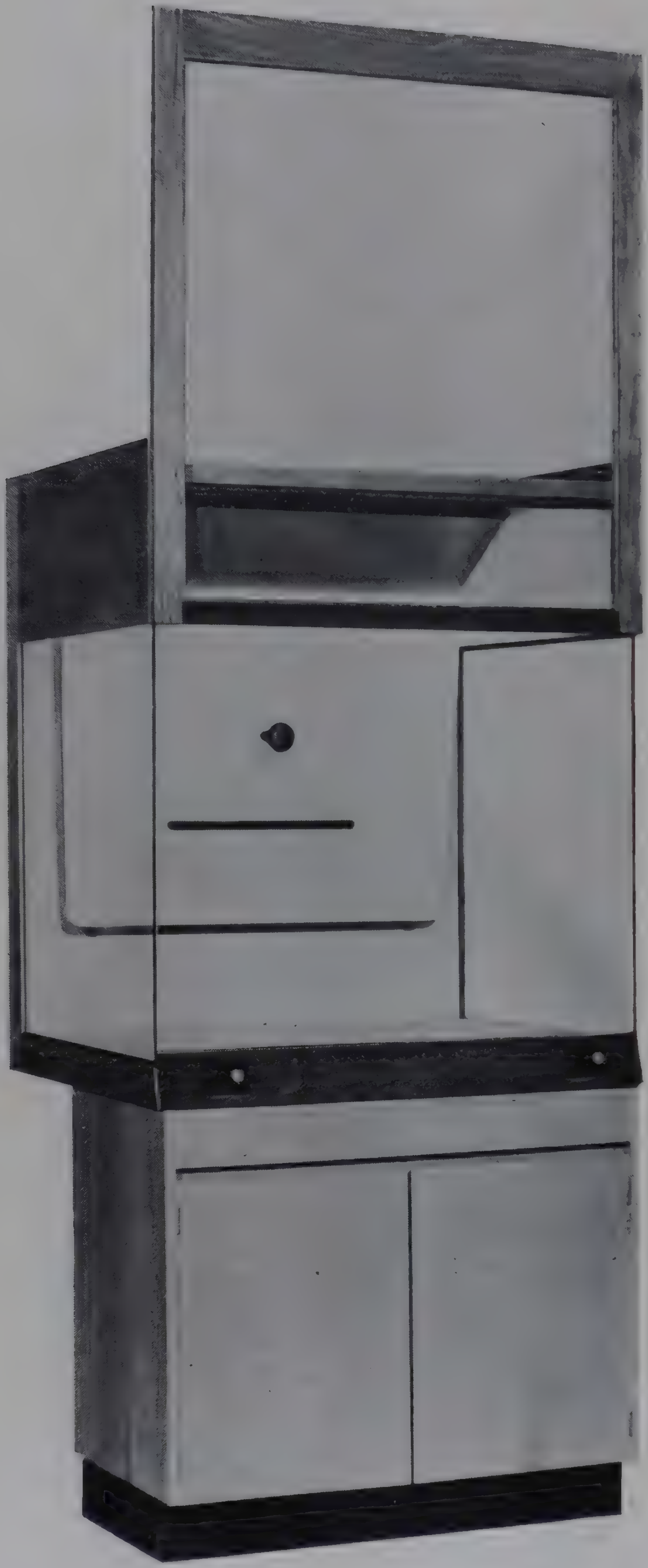
FV-300

FV-310

FV-311

Any of the above fume cupboards may be mounted on a table under frame. Prices on application.

Gallenkamp 'OPENFLOW' FUME CUPBOARDS



Dimensions:
Width 3 ft 8 in. Depth 2 ft 11 in. Height overall 7 ft 1 in. Height to working top 3 ft 2½ in.

For open sash working. Alternative models provide controlled draught or balanced extraction.

- **Positive air flow ensures there are no eddies into room**
- **Controlled draught unit uses minimum room-air**
- **Balanced extraction model conserves conditioned air in the laboratory, where necessary, by replacing calculated proportion of extraction with fresh air inducted from outside building**
- **Armoured glass sashes are used as safety screens—not to retain fumes inside cupboard**
- **One-hand adjustment baffles control air flow distribution**
- **No front stiles to impede access**
- **Removable ends (and divisions in multiple units) facilitate cleaning and decontamination**
- **Full width open bench top in range of cupboards when divisions are removed**
- **Corrosion resistant interior of armoured glass and protected asbestolite. Alternative materials available**
- **Exterior facings of melamine plastics, oak (illustrated), mahogany or teak, to match all bench ranges**

CONSTRUCTION

The carcase is cantilever framed in oak, the sash frame and inclined fascia being of teak. Only a very small amount of these timbers is exposed inside the cupboard, thus practically eliminating fire and corrosion hazards. The counterpoised sash runs on terylene lines.

SERVICES

Front controlled services may be mounted on the inclined fascia with either integral nozzles, or remote controlled nozzles mounted at the back of the cupboard. Sinks may be fitted in the base, and electrical switches fixed to the top panel of the carcase unit.

ADDITIONAL LIGHTING

Top lighting may be achieved by means of a glazed panel let into the roof and in addition an electric light may be fitted to illuminate through this panel. Price on application.

FIXING

These fume cupboards are self-supporting, but light wall fixing at the top is essential. Wherever possible we recommend that our installation engineers erect cupboards and extraction/induction plant.

Gallenkamp 'OPENFLOW' FUME CUPBOARDS

FV-312

FUME CUPBOARD, *Openflow*, 3 ft 8 in wide × 2 ft 11 in deep × 4 ft 3 in high for mounting on existing bench top or table underframe. All glazing in toughened glass with side panels removable. Working top of black technoplate with back and roof of protected asbestolite. The cupboard is fitted with adjustable baffle FV-307.

This cupboard is arranged for controlled draught only.

Services

2 panel mounting gas taps with integral nozzles FW-110.

Each **£129. 0. 0.** *f*

FV-312

FV-313

FUME CUPBOARD, *Openflow*, 3 ft 8 in wide × 2 ft 11 in deep × 7 ft 1 in high. Comprises fume cupboard FV-312 set on cupboard unit as FU-581. Working top of black technoplate. Two end service panels as FU-751. The cupboard is fitted with adjustable baffle FV-307.

This unit is arranged for controlled draught only.

Services

2 panel mounting gas taps with integral nozzles FW-110.

Each **£159. 5. 0.** *f*

FV-312 and FV-313 can be equipped for balanced extraction working. Details and prices on application.

FV-313

FV-314

FUME CUPBOARD, *Openflow*, 14 ft 2 in wide × 2 ft 11 in deep × 7 ft 1 in high. Comprises 4 fume cupboards FV-312 **arranged for balanced extraction,** set on 4 cupboard units as FU-581 arranged with a continuous plinth to form duct for balanced air intake. 2 end service panels as FU-751. Each section fitted with adjustable baffle FV-307. Working top of black technoplate with 6 holes for drip wastes and 1 notch for sink.

Services

6 black polythene drip wastes FW-492. 1 sink 8 × 6 × 6 in FW-400. 1 plug FW-436. 8 water taps, front control FW-140 with bends FW-151. 8 panel mounting gas taps with integral nozzles FW-110. 4 panel mounting compressed air taps FW-112. 1 pair sink straps FW-401.

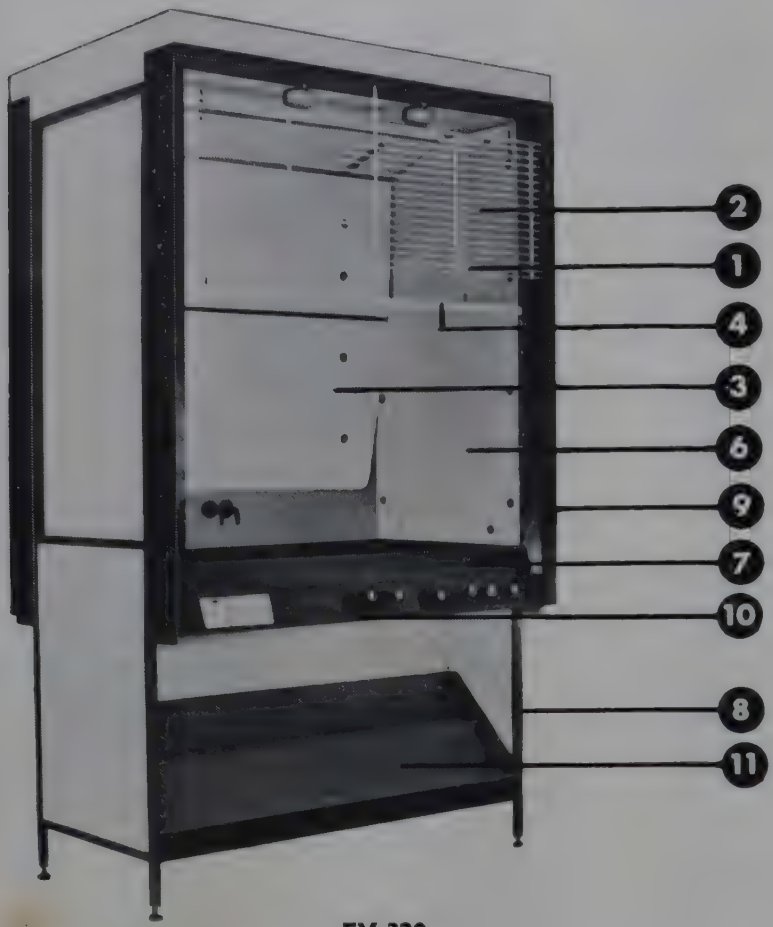
Each **£734. 10. 0.** *f*

This cupboard can be supplied for controlled draught only. Details and prices on request.

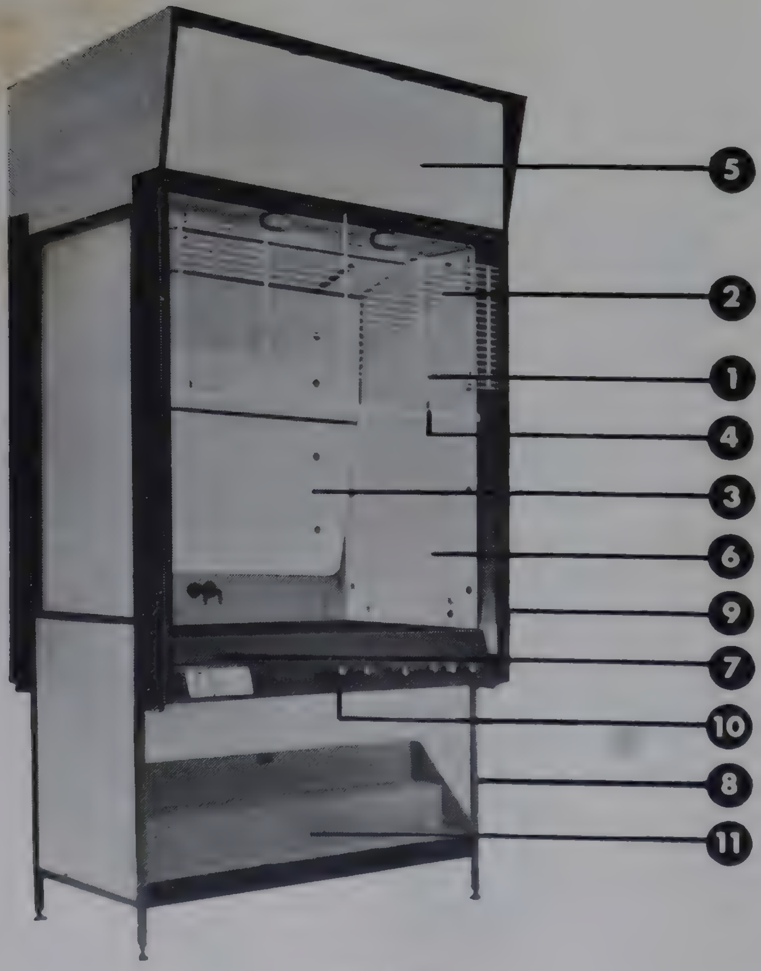
FV-314

For full details of FU-751 and FU-581 ask for catalogue **Laboratory Furniture and Fittings.**

Gallenkamp 'OPENFLOW II' FUME CUPBOARDS



FV-320



FV-322

HIGH EFFICIENCY AIR-FLOW

The sash is used as a safety screen—not to retain fumes within the cupboard. Positive air-flow ensures that no eddies pass into the room and efficient scavenging is achieved with the minimum consumption of air from the laboratory.

- **Duct through double element sash** (1) and **grille of main by-pass duct** (2) provide progressive two stage by-pass which automatically controls air velocity beneath the sash as it is raised or lowered.
- **Three element pre-adjusted baffle** (3) stabilises extracted air-flow.
- **Balanced draught duct incorporating baffle and filter** (5) further conserves conditioned air in laboratory by replacing calculated proportion of extraction with fresh air taken from outside building.

CORROSION RESISTANT MATERIALS

Technoplate* toughened glass body. Ends (6) sash (4) extraction baffles (3). Stainless steel (FMB grade) back and outlet duct connector.

Stainless steel, FMB grade, tanked work top (7) with rounded interior corners and waste outlet. Slate tanked top available if specified.

Condensation, if ocurring, forms mainly on toughened glass and stainless steel surfaces, to fall directly inside lips of tanked work top.

GENERAL FEATURES

Sectional construction facilitates handling and reduces freight charges.

End frames (8) of square section steel tube, with floor-level adjusters.

Picture frame (9) of Moulmein teak, finished with polyurethane. Front rail (10) mounts front controlled services. Rear frame also of teak.

Rimless double element sash (4) with interlocking weights counterpoised on stainless steel lines.

Low voltage lighting by two 12V lamps with polypropylene bodies.

Stepped bottle shelves (11) of PVC. Can be vented by exhaust system as optional extra.

Cleaning and decontamination facilitated by smooth finish, rimless panels and sashes.

***Technoplate** toughened glass is capable of withstanding both considerable impact and distributed heat. It is absolutely unaffected by the action of all alkalis and organic substances and all acids, with the exception of hydrofluoric acid. To minimise the effect of the latter, the Technoplate used in the construction of the cupboard is obscured, by etching in the case of the extraction baffle elements, and by ceramic white fired externally on the end panels. The result is that such etching as may occur is not readily discernible.

Gallenkamp 'OPENFLOW II' FUME CUPBOARDS

STABILISED EXTRACTION SYSTEM

When the sash is fully raised to provide an access height of 2 ft 9 in, the air drawn into the cupboard passes across the open face beneath the sash. Velocities are acceptably even. As the sash is lowered, the stage one by-pass between the two sash elements conveys air to the top of the cupboard to control velocity over the reduced face aperture. As the sash is brought down still further, the stage two main by-pass is operated, again to limit face velocity beneath the sash. This control is maintained until the sash is fully lowered. According to the task to be performed, nominal face velocities (with sash fully raised) can vary from 40 to 120 ft/min dependent on the fan and duct system employed. Within this range, the exceptionally gentle nature of the extraction will interfere in no way with the work being done, and efficient scavenging is assured.

FV-320

FUME CUPBOARD *Gallenkamp* **'Openflow II' with by-pass, for stabilised extraction.** Overall 4 ft 9 in wide × 3 ft 0 in deep × 8 ft 0 in high. Body ends and extract baffle of obscured 'Technoplate' toughened glass. Back and duct connector (for nominal 7 in diameter pipe), of FMB grade stainless steel. Double element sash of transparent 'Technoplate' toughened glass, counterpoised with interlocking weights on stainless steel lines. Picture frame of Moulmein teak, with by-pass grille finished in white polyurethane, and fitted interior lights. Rear frame of teak. Outer roof of laminated timber with white polyurethane finish. Tanked work top made from FMB grade stainless steel with waste outlet. End frames of square section steel, with floor-level adjusters and lower panels finished both sides in white melamine plastics. Stepped Winchester quart bottle rack of PVC fitted below cupboard with back finished in white melamine plastics. Front controlled services mounted on inclined fascia panel include one switch wired to interior lighting, two 13A electric sockets, two cold water fittings FW-140, with two vertical mounting swannecks FW-152, two gas cocks FW-110, one vacuum valve FW-111 and one compressed air valve FW-112.

Complete unit, dismantled into sections, excluding all plumbing and electrical connections and excluding exhaust fan and trunking ... ... Each **£389. 15. 0.** f

DIMENSIONS	FV-320	FV-322
WIDTH, overall	4 ft 9 in	4 ft 9 in
WIDTH, internal	4 ft 6 in	4 ft 6 in
DEPTH, overall	3 ft 0 in	3 ft 3 in
DEPTH, internal	2 ft 0 in	2 ft 0 in
HEIGHT, overall	8 ft 0 in	9 ft 6 in
HEIGHT, inside fume cupboard	4 ft 8 in at front 4 ft 4 in at rear	4 ft 8 in at front 4 ft 4 in at rear

BALANCED DRAUGHT SYSTEM

It is wasteful if a fume cupboard removes excessive quantities of expensively conditioned air from the laboratory. This applies particularly in a small room accommodating several cupboards, and/or where a cupboard is provided with extraction involving a high face velocity, say 100 ft/min, to remove highly toxic or corrosive fumes. The FV-322 balanced draught system overcomes the problem by replacing a calculated proportion of the extraction with untreated air drawn from outside the building. This balancing air is passed from the roof of the cupboard, through a larger filtered duct, to discharge at low velocity vertically behind the sash. It becomes entrained with air, induced from the room across the open face beneath the sash, to form a flow pattern resembling that of the FV-320 stabilised extraction system. The result is a significant reduction of velocity across the open face. Usually approximately 55% replacement with untreated air is achieved but the proportion can be varied sometimes by selecting appropriate fans to suit specific requirements. The system, by reason of its gentle action, offers no discomfort to the operator nor interferes with work in hand. This, coupled with extremely efficient scavenging, is a condition rarely found in balanced and auxiliary air fume cupboards.

FV-322

FUME CUPBOARD *Gallenkamp* **'Openflow II', with by-pass, for balanced draught and stabilised extraction.** Overall 4 ft 9 in wide × 3 ft 0 in deep and 3 ft 3 in deep at ceiling × 9 ft 6 in high. As FV-320, but with balanced draught duct mounted on roof. Duct fabricated from laminated timber, finished externally in white polyurethane, with interior baffle and glass-fibre filter. An inlet hole of 10 in diameter is provided in the roof of the duct to accommodate a flanged entry.

Complete unit, dismantled into sections, excluding all plumbing and electrical connections and excluding fans and trunking ... ... Each **£420. 6. 0.** f

OPTIONS (for FV-320 and FV-322)

Tanked work top can be provided in specially selected slate, with black polythene waste outlet, in place of stainless steel top, **if specified, at no extra cost.**

Perchloric acid extraction baffle, with water cooling, and **venting of space above PVC bottle rack,** will, on request, be designed to suit requirement and a quotation provided.

ASSEMBLY AND INSTALLATION. Assembly instructions are provided with each fume cupboard, but it is recommended wherever possible our factory-trained personnel should be employed. Quotations will be provided on request for assembly, installation, plumbing and electrical connections.

Detailed leaflet on application.

FUME EXHAUST FANS

Efficient fume extraction plant is one of the most important features in a chemical laboratory and *Gallenkamp* are specialists in the field of designing, manufacturing and erecting such equipment. A complete service is offered based on many years experience and specialist engineers are available to advise on the selection of plant and subsequently to prepare designs and estimates.

The centrifugal and axial flow fans illustrated and specified have been designed to satisfy the varied and exacting requirements of laboratory fume extraction. Centrifugal fans have housings of specially selected polyster resin which bonds glass fibre, and impellers are of cast epoxy resin. Axial flow fans, recommended for use in less exacting conditions, also have polyester resin housings and motors are protected by epoxy resin enamel. Resin bonded materials have proved themselves as being particularly suitable for laboratory fume extraction, being extremely resistant to corrosive fumes and to perform satisfactorily in temperatures up to 120°C. There are four sizes in the range of centrifugal fans and two axial flow units, which enable very many plants to comprise standard fans and ducting at relatively small cost. If necessary, however, complete systems of a special nature can be supplied. For example centrifugal fans of close grained cast iron, coated with cold cured resin or PTFE are available. Fans can also be fabricated from rigid unplasticised PVC, and such units are usually employed in a plant which calls for fans larger than those contained in the standard ranges.

Ducting from fume cupboards to atmosphere can be fabricated from rigid unplasticised PVC or polypropylene, and for very many installations anti-acid treated asbestolite is much favoured.

Many plants are designed to meet the exacting conditions created by radioactive dust and toxic or explosive fumes. In these cases a high rate of extraction is usually required, and fans and ducting associated with balanced extraction systems can be incorporated in such schemes to reduce loss of conditioned air within the laboratory. We are also able to advise on the installation of laboratory air conditioning plant, which is a closely allied subject.

Plant design. We can advise on the selection of suitable equipment and prepare designs and estimates. Our design staff is at the disposal of customers contemplating new installations and if necessary a ventilation engineer will call to discuss details.

Projects however can be fully appreciated if the following information is provided:—

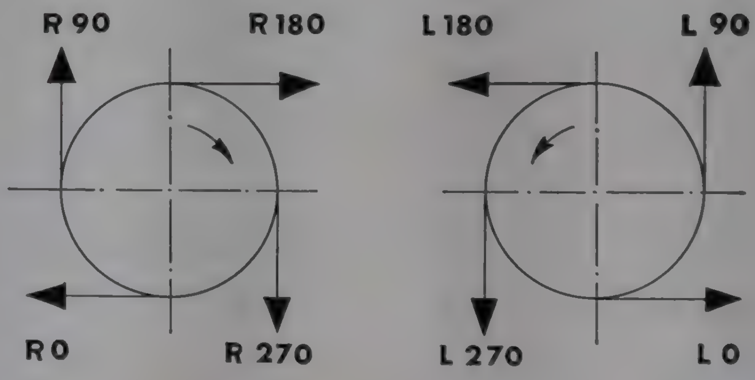
Plans and sectional drawings or dimensioned sketches, indicating the proposed position of the fume chamber, possible siting of the fan and an indication of the run of ducting.

Power supply. Please state voltage and characteristics of supply.

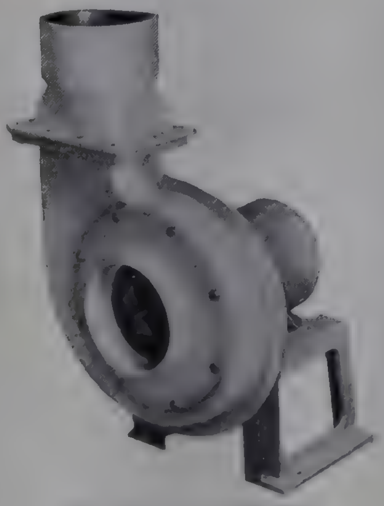
Hand of discharge. Please state prefix letter and figure required as shown on chart.

Nature of particularly corrosive fumes likely to be exhausted, with an indication of maximum temperature involved if likely to exceed 50°C.

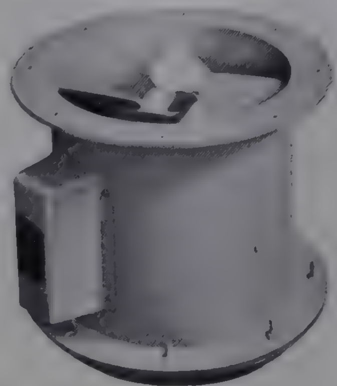
Hands (directions) of discharge



The fans are viewed from the driving side and the angle of discharge is designated by the figures following the prefix, measured in degrees, and starting from the horizontal.



FV-326 and FV-327



FV-334

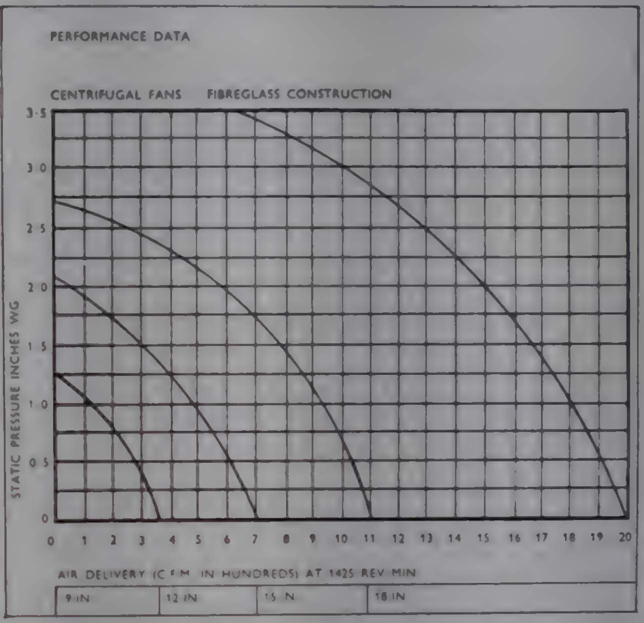
FIBREGLASS CENTRIFUGAL FANS FV-326 and FV-327

Fan housings are moulded from specially selected polyester resin and glass fibres in the ratio of approximately 2 to 1; being so constructed that no bolts, nuts or screws project into the interior of the casing. Inlet plates are fitted with spigots for connection to ducting. Outlets are flanged and fitted with treated asbestos developments. Plastics condensate drain plugs, screwed ¼ in gas thread are fitted at the lowest point of the housings.

Impellers are of the radial vane type, cast in one piece from selected epoxy resin only.

Motors. Direct coupled to the impeller, with a fume seal where the motor shaft enters the fan housing. Wound for single or three phase a.c. supply. Squirrel cage, drip-proof type casings are standard. Totally-enclosed or flame-proof motors can be supplied at extra cost.

Starters are of the push-button contactor type, fitted with no-volt and overload releases. Other starters can be supplied if required.



AXIAL FLOW FANS FV-334

Provide a compact and economical means of extraction from small fume cupboards. They may be inserted in a short run of ducting or fixed directly to the cupboard.

Fan chambers are moulded from polyester resin and glass fibre. Exterior metal flanges are fitted at each end for inserting in a run of ducting, or a PVC angle ring at one end for fixing directly to the fume cupboard.

Fan blades are fabricated from nylon 2.

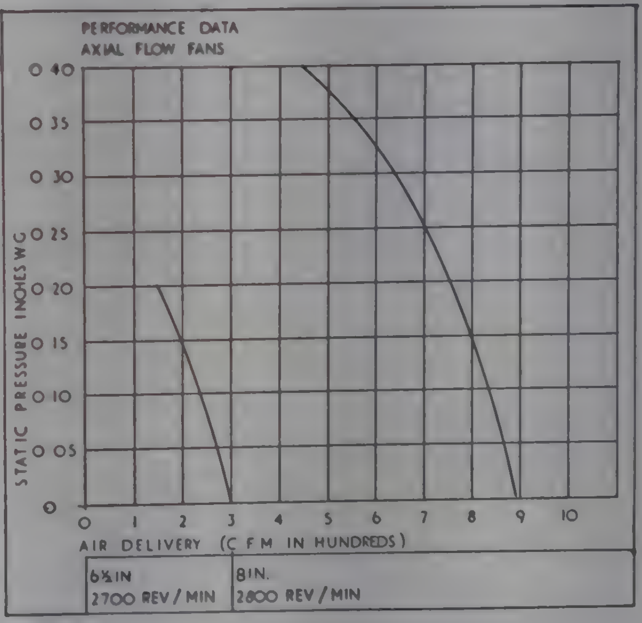
Motors are of the capacitor start and run type, totally enclosed, with condensers mounted on the outside of the chamber.

Fans are available in two sizes, 6½ in and 8½ in diameter and require 7 in internal diameter heavy duty asbestolite ducting for the smaller fan, and 9 in internal diameter for the larger.

Exposed metal parts are treated with epoxy resin enamel.

Standard motors for both the axial and centrifugal fans are suitable for use in temperate and many tropical areas, but where temperature exceeds 40°C, relative humidity is more than 80%, or altitude is greater than 3200 ft, special motors and starters are necessary. Full details and prices on application.

Standard fans are not necessarily used in our plant designs, and are often fabricated specially to suit particular requirements.



TECHNICAL DATA

Type	Fan size	Speed rev/min	hp	Air delivery. Free intake and discharge	Approx. weight	Outlet pipe internal dia.	Inlet pipe internal dia.	Overall dimensions
Centrifugal	9 in	1425	¼	320 ft³/min	40 lb	5 in	5 in	15 × 16 × 16½ in
	12 in	1425	⅓	660 ft³/min	52 lb	6 in	6 in	16 × 19 × 20 in
	15 in	1425	¾	1150 ft³/min	65 lb	7 in	7 in	17 × 23½ × 23½ in
	18 in	1425	1½	2000 ft³/min	110 lb	9 in	9 in	20½ × 26 × 25 in
Axial flow	6½ in	2700	·05	300 ft³/min	12 lb	7 in	7 in	9 × 10 in dia.
	8½ in	2800	·05	900 ft³/min	15 lb	9 in	9 in	9 × 12 in dia.

FUME EXHAUST FANS

(continued)

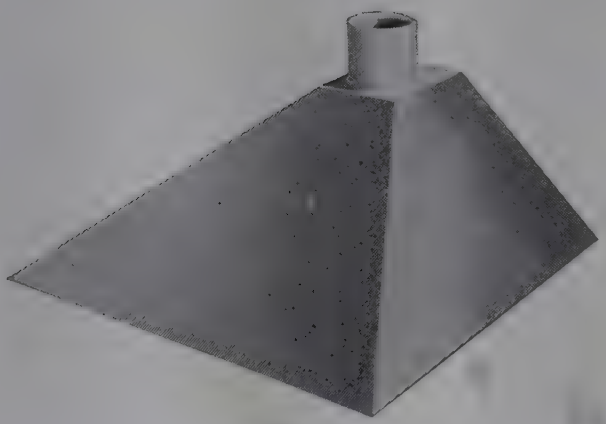
		SIZE OF FAN				
		9	12	15	18 in	
FV-326 **FANS, centrifugal, fibreglass,** direct coupled to motor, for 200/220, 230, or 240/250V 50 Hz single phase supplies	Each	£76. 15. 0.	£92. 12. 6.	£127. 5. 0.	£157. 17. 6.	*mN*
FV-327 **FANS, centrifugal, fibreglass,** direct coupled to motor, for 380/420 or 400/440V 50 Hz three phase supplies	Each	£76. 15. 0.	£92. 12. 6.	£108. 2. 6.	£141. 17. 6.	*mN*
FV-328 **STARTERS,** push-button, with combined thermal and magnetic overload releases, for FV-326	Each	£5. 0. 0.	£5. 0. 0.	£5. 0. 0.	£8. 0. 0.	*mN*
FV-329 **STARTERS,** push-button, with combined thermal and magnetic overload releases, for FV-327	Each	£5. 0. 0.	£5. 0. 0.	£5. 0. 0.	£5. 0. 0.	*mN*
FV-330 **SHELVES,** asbestolite, with steel cantilevers for supporting fan and motor on wall	Each	£4. 5. 0.	£4. 5. 0.	£5. 15. 0.	£6. 2. 6.	*mN*

		SIZE OF FAN		
		6½	8½ in	
FV-334 **FANS, axial flow, fibreglass,** with motor for 220/240V 50 Hz single phase supplies	Each	£42. 0. 0.	£58. 15. 0.	*m*
FV-335 **STARTERS,** push-button, with thermal overload release, for FV-334	Each	£1. 19. 0.	£1. 19. 0.	*m*
FV-336 **FLANGES,** matching, to connect axial flow fan to ducting.	Pair	£3. 17. 6.	£4. 5. 0.	*m*
FV-337 **GASKETS,** jointing, for use with matching flanges	Pair	£0. 17. 0.	£0. 17. 6.	*m*
FV-338 **RINGS,** angle, PVC to connect axial flow fan to fume cupboard	Each	£2. 18. 6.	£3. 12. 6.	*m*

When ordering please state voltage and nature of supply.

Prices for equipment wound for non-standard a.c. and d.c. supplies can be quoted on application.

COMBUSTION HOODS



FV-340

FV-340

COMBUSTION HOOD, asbestolite, moulded in single piece, anti-acid treated on all surfaces, 2 ft wide × 2 ft deep × 9½ in high with spigot for 5 in diameter flue. For wall fixing, **without brackets or flue pipe.** Each **£7. 0. 0.** c

FV-342

COMBUSTION HOOD, asbestolite, as FV-340, 4 ft wide × 2 ft 3 in deep × 1 ft 5 in high, **without brackets or flue pipe** ... ... Each **£11. 5. 0.** c

FV-344

COMBUSTION HOOD, asbestolite, as FV-340, 6 ft wide × 2 ft 3 in deep × 1 ft 5 in high, **without brackets or flue pipe** ... ... Each **£20. 11. 6.** c

FV-346

BRACKETS, cantilever, metal, enamelled, 3 ft long, for mounting hoods on wall ... ... Pair **£1. 19. 0.** c

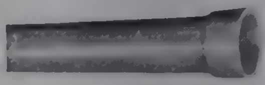
Fabricated hoods to suit special needs also available. Details on application.

Items on this page normally available from stock except those coded *N*.

ASBESTOLITE FLUE PIPES

Made of asbestos material, specially treated to resist acid fumes.
Pipes are easily cut with a fine saw and secured to walls, etc., with ordinary fascia brackets.

		INTERNAL DIAMETER						
		4	5	6	7	8	9 in	
FV-350 **STRAIGHT PIPES,** with socket. In 6 ft lengths	Each	33/-	41/6	52/6	93/-	102/-	122/-	c
FV-351 **SOCKETS,** loose, to connect unsocketed pipes...	Each	8/-	11/-	13/9	21/3	25/-	30/-	c
FV-352 **BENDS,** 90°, with socket ...	Each	12/-	15/-	18/6	35/-	56/-	60/-	c
FV-353 **BENDS,** 110°, with socket ...	Each	12/-	15/-	18/6	35/-	56/-	60/-	c
FV-354 **BENDS,** 135°, with socket ...	Each	12/-	15/-	18/6	35/-	56/-	60/-	c
FV-357 **TEES,** equal	Each	12/-	15/-	18/6	35/-	56/-	60/-	c
FV-358 **TEES,** reducing, branch pipe of 4 in dia. Main pipe as listed	Each	—	15/-	18/6	95/-	114/-	117/-	c
FV-359 **TEES,** reducing, branch pipe of 5 in dia. Main pipe as listed	Each	—	—	18/6	95/-	114/-	117/-	c
FV-360 **TEES,** reducing, branch pipe of 6 in dia. Main pipe as listed	Each	—	—	—	95/-	114/-	117/-	c
FV-361 **ADAPTERS,** tapered, small end 4 in dia. Large end, with socket, as listed.	Each	—	14/-	16/9	—	—	—	c
FV-362 **ADAPTER,** tapered, small end 5 in dia. Large end, with socket, as listed.	Each	—	—	17/9	—	—	—	c
FV-363 **COWLS,** anti-pocket, with deflector cap and socket...	Each	37/3	48/-	54/-	—	72/6	—	c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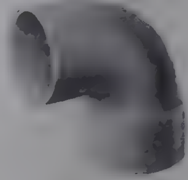
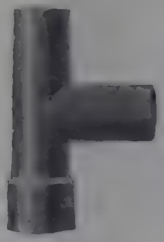
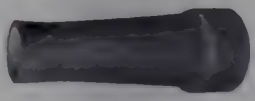

FV-352

FV-353


FV-357

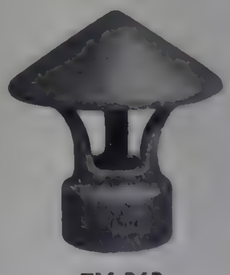

FV-361
FV-362

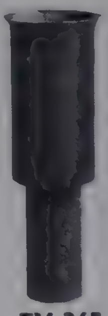
FV-365

DISCHARGE TERMINAL CAPS, for high velocity terminal discharge. Constructed throughout from anti-acid treated asbestolite with PVC inserts, designed to eliminate the possible entry of rainwater also to ensure that outgoing fumes discharge vertically. This terminal assists fan performance, as it offers practically no resistance.

Size of terminal	4 in	5 in	6 in	7 in	8 in	9 in dia.	
Each	113/6	142/6	156/-	177/6	198/6	220/-	*mN*

Pipes of 4, 5 and 6 in dia. are normally supplied in light quality, whereas pipes of 7, 8 and 9 in dia. are only manufactured in heavy quality. Fittings involving pipes of both large and small diameter, e.g., reducing tee FV-358, 7–4 in, are supplied throughout in heavy quality, whilst the same pattern reducing tee 6–4 in is supplied throughout in light quality. The unsocketed end of a heavy duty pipe will not fit into the socket of a light duty pipe of equal dia., but can be accommodated within an unsocketed light duty pipe of 1 in larger dia.


FV-363


FV-365

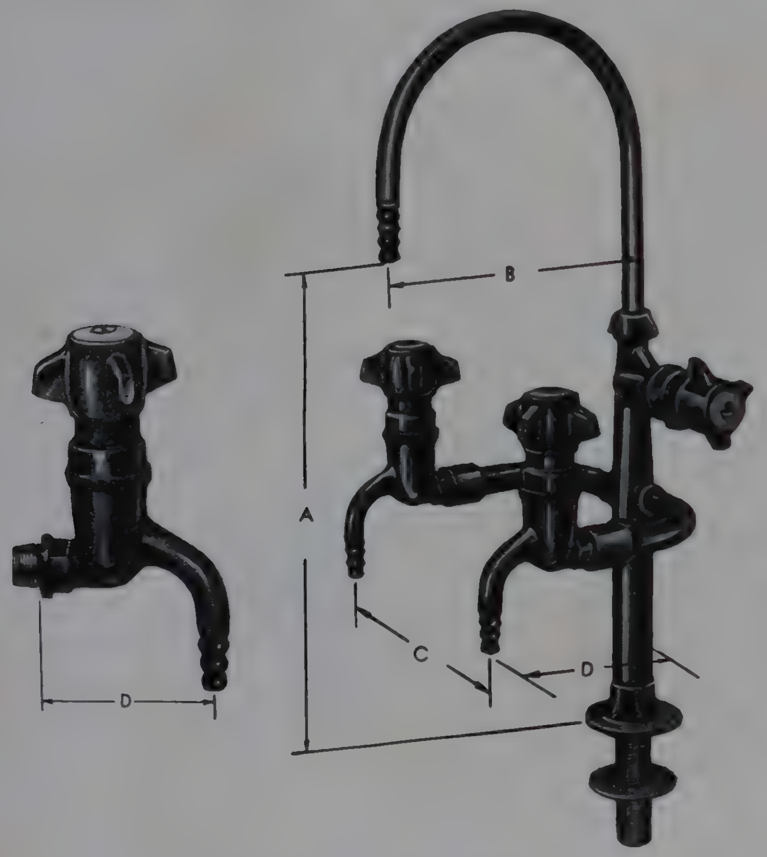
Items on this page normally available from stock except those coded *N.*

SERVICE CONTROLS FOR WATER, STEAM, GASES, COMPRESSED AIR AND VACUUM

Black plastics corrosion resistant finish. Control heads have distinctive shapes. Colour and letter coded controls denote service.

GENERAL CONSTRUCTION

All fittings generally made from heavy drawn brass tubing, hot brass pressings and extruded brass bar. Stainless steel and various plastics are included where advantageous. All taps have black plastics corrosion resistant finish. This is an epoxy resin based material which is stoved on to a specially prepared surface. To avoid damage, spanners should not be used without protecting the jaws. This finish is also available in colours which can be supplied to special order. Chromium plated finish can also be supplied.



CONTROL HEADS

All handwheels and levers differ in shape. Made from high impact strength plastics. Designed to shroud the valve spindles and provide easy-clean shapes. All controls differ in shape according to the service and have appropriate coloured disks engraved with code letters.

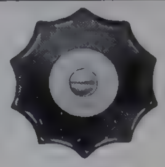
Swannecks and nozzles for front controlled fittings are supplied in colour to match disk inserts on control heads.

Dimension. The lettered illustrations on this page identify the dimensions in the tap specifications.

Bib taps. Throw D is measured from centre line of outlet nozzle to rear surface of entry flange.

Pillar taps. Throws B and D are measured from centre line of outlet nozzle to centre line of standard. C is measured between centre lines of outlet nozzles. Height A is taken from under surface of bench flange plate to underside of nozzle outlet.

SERVICE IDENTIFICATIONS

SHAPE OF CONTROL HEAD							
SERVICE	Cold Water	Hot Water	Steam	Vacuum	Compressed Air	Gas (mains)	Other Gases
COLOUR CODE	Azure Blue	French Blue	Red	Lincoln Green	White	Canary Yellow	Grey
LETTER CODE	C W	H W	S	V	C A	G	

The following do not conform to colour or letter codes, shape or finish indicated.

FW-106 Water stopcocks.
FW-145 Water tap.
All PVC water fittings.
FW-210 Gas stopcocks.
FW-410 Mixer tap.
All economy range gas taps.

WATER TAPS

Manufactured to BS 1010 specification and complying with the requirements of the joint licensing scheme operated by the BWA and BSI, so far as these apply to laboratory fittings.

Glands of low friction material and shrouded composition washers are fitted in fixed jumpers, equally suitable for hot or cold supply.

SERVICE INLET DETAILS

Water fittings inlets are ½ in BSP male thread and all other services ¼ in BSP male or female thread. Bench mounting gas taps are normally screwed ¼ in BSP female thread and drilled for wood screws.

OUTLET DETAILS

Water swan-neck outlets have fixed corrugated nozzles as standard. Removable nozzles are available to order. Tap outlets have fixed or removable corrugated nozzles as standard.

Gas and vacuum fittings have fixed nozzles.

NEEDLE VALVES

Supplied for either bench or vertical mounting or in two forms of underbench front control. For use with compressed air, oxygen, nitrogen or steam.

GAS COCKS

The gas cocks incorporated in bench fittings will give long trouble free life. The plug is spring loaded to remain in adjustment over a long period. Underbench gas cocks have a similar specification. Approved for use with Calor gas.

DIAPHRAGM VALVES

Developed specially for laboratory work. When supplied for vacuum, throttles are fitted to nozzles to restrict throughput to 6 litres/min at 25 in Hg.

INSTALLATION RECOMMENDATIONS

If water is tank supplied, a minimum head of 35 ft (15 lb/in²) is required to operate water jet pumps.

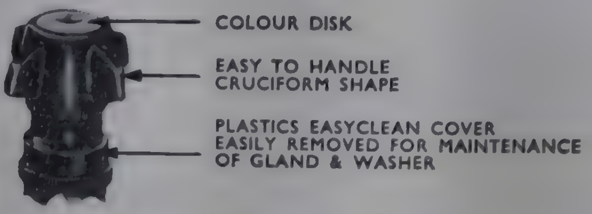
It is important to keep compressed air and other service pressures as low as possible, as a pressure of over 15/20 lb/in² at the bench is dangerous.

It is essential that all service piping be flushed or blown clear of solid matter before any of the bench valves are used.

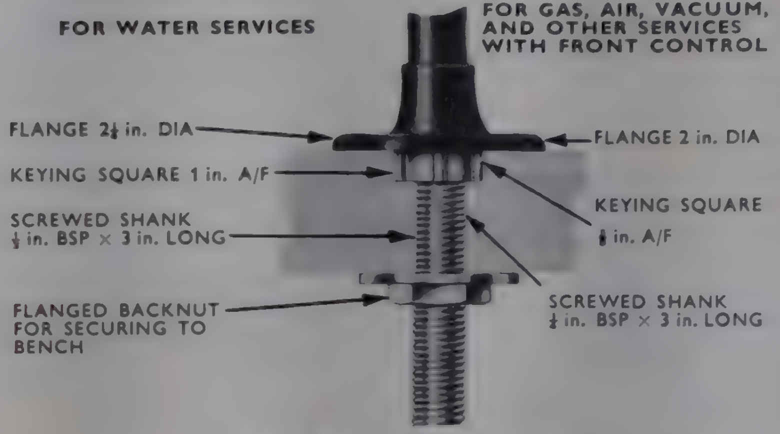
It is desirable that stop valves be fitted so that conveniently small sections of the laboratory can be isolated, both from safety and maintenance viewpoints.

Where a sink is to be used for wash-up purposes, the water supply should be by large bore individual water standards or mixer (FW-020/FW-001, FW-042, FW-043). Where front controlled valves are used on benches or in fume cupboards, a single-way outlet only (FW-155, etc.) is permissible.

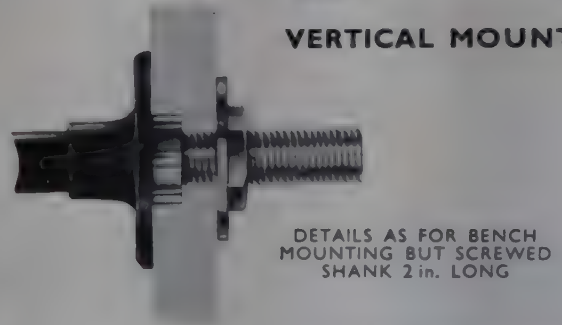
We recommend that a suitable proportion of water fittings are specified with detachable nozzles, to give long term flexibility to the laboratory.


COLOUR DISK
EASY TO HANDLE CRUCIFORM SHAPE
PLASTICS EASYCLEAN COVER EASILY REMOVED FOR MAINTENANCE OF GLAND & WASHER

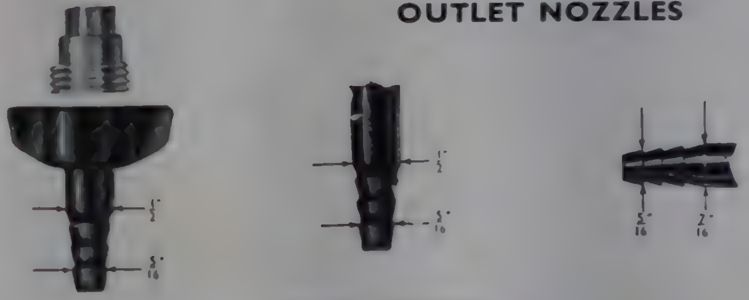
BENCH MOUNTING


FOR WATER SERVICES
FOR GAS, AIR, VACUUM, AND OTHER SERVICES WITH FRONT CONTROL
FLANGE 2¼ in. DIA
FLANGE 2 in. DIA
KEYING SQUARE 1 in. A/F
KEYING SQUARE ⅞ in. A/F
SCREWED SHANK ½ in. BSP × 3 in. LONG
SCREWED SHANK ¼ in. BSP × 3 in. LONG
FLANGED BACKNUT FOR SECURING TO BENCH

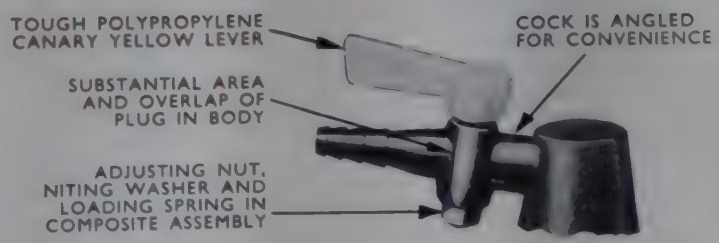
VERTICAL MOUNTING

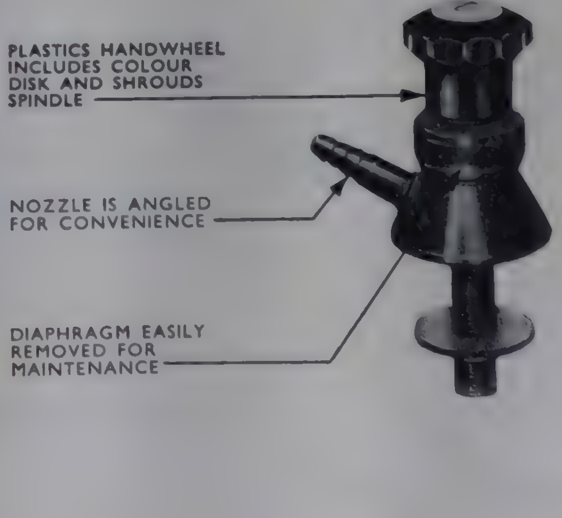

DETAILS AS FOR BENCH MOUNTING BUT SCREWED SHANK 2 in. LONG

OUTLET NOZZLES


½"
5/16"
½"
5/16"
5/16"
7/16"

GAS COCKS


TOUGH POLYPROPYLENE CANARY YELLOW LEVER
COCK IS ANGLED FOR CONVENIENCE
SUBSTANTIAL AREA AND OVERLAP OF PLUG IN BODY
ADJUSTING NUT, NITING WASHER AND LOADING SPRING IN COMPOSITE ASSEMBLY


PLASTICS HANDWHEEL INCLUDES COLOUR DISK AND SHROUDS SPINDLE
NOZZLE IS ANGLED FOR CONVENIENCE
DIAPHRAGM EASILY REMOVED FOR MAINTENANCE

FW-001

FW-002
FW-003

FW-005

FW-006

FW-007

FW-008

FW-009

FW-011

FW-012 (enlarged scale)

WATER FITTINGS

PIPE MOUNTING

FW-001

BIB TAP, screw down valve. Inlet ½ in male, outlet plain, with anti-splash. (D = 3 in).
Dozen **£24. 0. 0.** Each **£2. 4. 0.** c

FW-002

BIB TAP, screw down valve. Inlet ½ in male, outlet corrugated nozzle. (D = 3 in).
Dozen **£25. 0. 0.** Each **£2. 5. 0.** c

FW-003

BIB TAP, screw down valve. Inlet ⅜ in male, outlet corrugated nozzle. (D = 2½ in).
Dozen **£24. 0. 0.** Each **£2. 4. 0.** c

FW-004

BIB TAP, screw down valve. Inlet ⅜ in male, outlet grooved tapered nozzle for bottle washing and filling.
Dozen **£24. 0. 0.** Each **£2. 4. 0.** c

FW-005

BIB TAP, screw down valve. Inlet ⅜ in male, outlet ½ in male for use with filter pump. (D = 2½ in). Complete with wing nut and nozzle.
Dozen **£28. 0. 0.** Each **£2. 11. 0.** c

FW-006

DROP TAP. Inlet ½ in male, outlet corrugated nozzle. (D = 3½ in) ... Dozen **£24. 10. 0.** Each **£2. 5. 0.** c

FW-007

DROP TAP. Inlet ½ in male, outlet ½ in male for use with filter pump. (D = 4 in). Complete with wing nut and nozzle ... ... Dozen **£28. 0. 0.** Each **£2. 11. 0.** c

FW-008

ANGLE TAP. Inlet ⅜ in male, outlet corrugated nozzle. (D = 2 in) ... Dozen **£24. 10. 0.** Each **£2. 5. 0.** c

FW-009

ANGLE TAP. Inlet ⅜ in male, outlet ½ in male for use with filter pump. (D = 3½ in). Complete with wing nut and nozzle. Dozen **£28. 0. 0.** Each **£2. 11. 0.** c

FW-011

FILTER PUMP. ½ in female wing nut connection. Fitted with non-return valve and bleeder screw. Chromium-plated finish. (Pressure gauge can be supplied at extra cost) ... ... Dozen **£40. 0. 0.** Each **£3. 12. 0.** c

FW-012

WATER METERING CONTROL VALVE. ½ in female wing nut connection. Will regulate water supply down to slow drip.
Dozen **£22. 0. 0.** Each **£2. 0. 0.** c

Dimension code see page 354.

All items on this page normally available from stock.

WATER FITTINGS

BENCH MOUNTING

FW-020

WATER STANDARD. Inlet $\frac{1}{2}$ in male, outlet $\frac{1}{2}$ in female. Diamond way keyed base (A = 10$\frac{3}{4}$ in).
Each **£2. 12. 0.** c

FW-021

WATER STANDARD, as FW-020 (A = 13$\frac{3}{4}$ in).
Each **£2. 15. 0.** c

FW-022

WATER STANDARD. Inlet $\frac{1}{2}$ in male, outlet $\frac{3}{8}$ in female. Diamond way keyed base (A = 10$\frac{3}{4}$ in).
Each **£2. 12. 0.** c

FW-023

WATER STANDARD, as FW-022 (A = 13$\frac{3}{4}$ in).
Each **£2. 15. 0.** c

FW-026

PILLAR TAP, with movable swanneck. Inlet $\frac{1}{2}$ in male, outlet corrugated nozzle. Diamond way keyed base (A = 9 in, B = 6 in). ... ... Each **£4. 2. 0.** c

FW-027

PILLAR TAP, as FW-026 (A = 12 in).
Each **£4. 6. 0.** c

FW-028

PILLAR TAP, as FW-026 (A = 15 in).
Each **£4. 8. 0.** c

FW-031

PILLAR TAP, with swivel swanneck. Large bore outlet with anti-splash. Inlet $\frac{1}{2}$ in male. Diamond way keyed base (A = 9 in, B = 6 in) ... Each **£5. 2. 0.** c

FW-037

PILLAR TAP. Inlet $\frac{1}{2}$ in male. Needle control on outlet side of tap to facilitate accurate water control. (A = 9 in, B = 6 in). Unless otherwise specified, this fitting is supplied with right hand control ... Each **£6. 10. 0.** c

FW-038

WATER STANDARD, with two movable swannecks. Inlet $\frac{1}{2}$ in male (A = 12 in, B = 6 in, C = 6 in).
Each **£9. 10. 0.** c

FW-039

WATER STANDARD, with two bib taps. Standard inlet $\frac{1}{2}$ in male. Tap inlets $\frac{3}{8}$ in male (A = 9 in, C = 6 in, D = 5$\frac{1}{2}$ in) ... ... Each **£7. 18. 6.** c

FW-040

WATER STANDARD, with two bib taps, as FW-039 (A = 12 in) ... ... Each **£8. 2. 6.** c

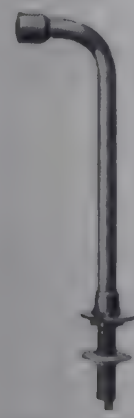
FW-042

MIXING TAP, with swivel swanneck. Inlets $\frac{1}{2}$ in male (A = 12 in, B = 6 in, C = 7 in). Many water authorities will not permit connection to main supplies.
Each **£7. 15. 0.** c

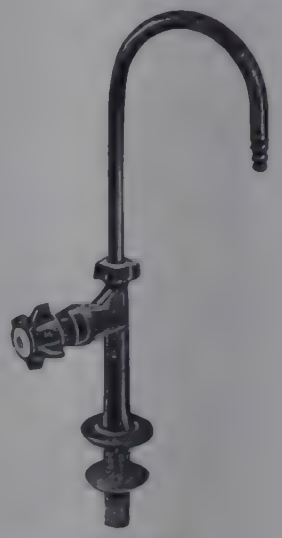
FW-043

MIXING TAP, with swivel swanneck, divided water flow. Inlets $\frac{1}{2}$ in male (A = 6 in, B = 7$\frac{1}{2}$ in, C = 7 in). Chromium plated finish ... ... Each **£10. 15. 0.** c

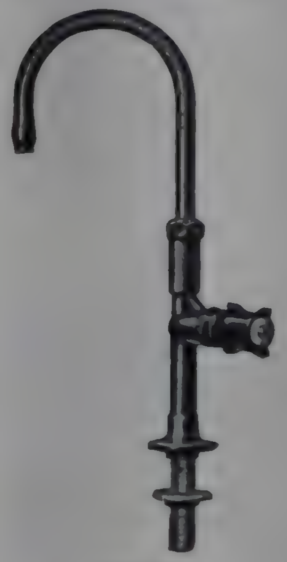
Dimension code see page 354.



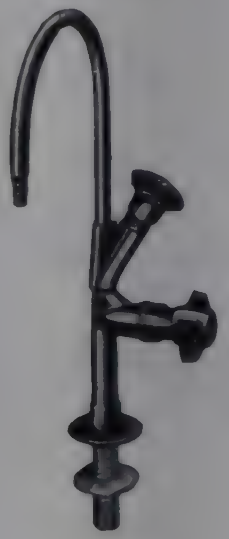
FW-020 FW-022
FW-021 FW-023



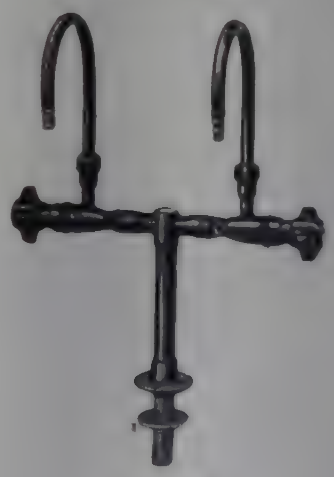
FW-026
FW-027
FW-028



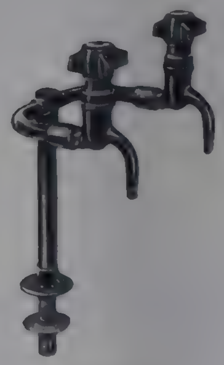
FW-031



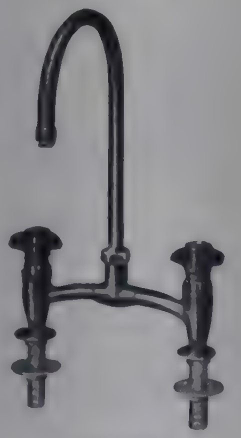
FW-037



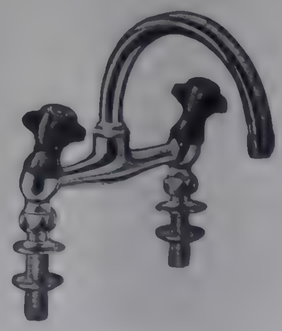
FW-038



FW-039
FW-040



FW-042



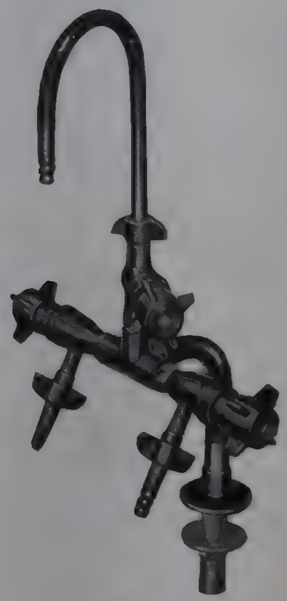
FW-043

All items on this page normally available from stock.

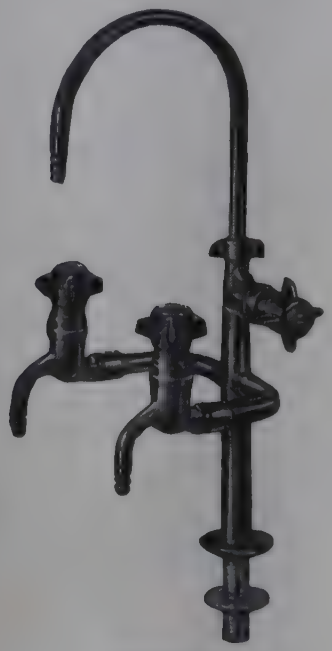
WATER FITTINGS

BENCH MOUNTING

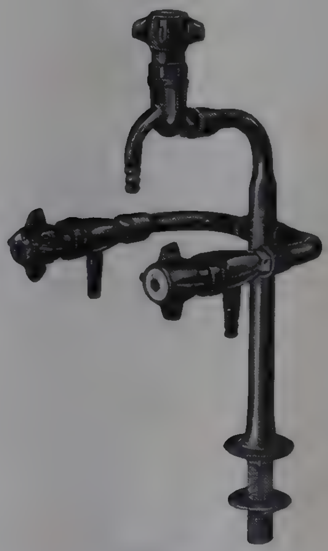
(continued)



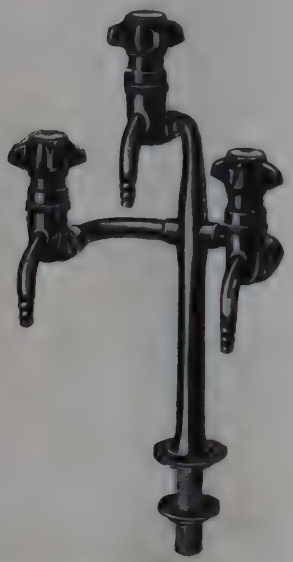
FW-044
FW-045



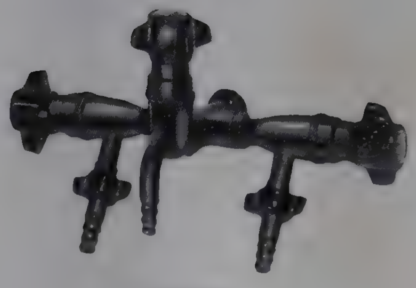
FW-046
FW-047



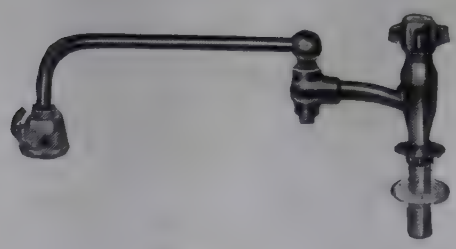
FW-048



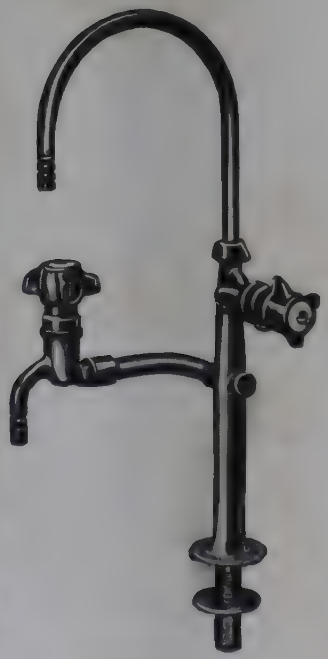
FW-049



FW-050



FW-058



FW-054

FW-044
PILLAR TAP, three way, with movable swanneck. Inlet ½ in male. Two side angle taps, inlets ⅜ in male and having detachable nozzles. (A = 12 in, B = 7½ in, C = 5 in, D = 3½ in) ... ... Each **£10. 6. 0.** c

FW-045
PILLAR TAP, three way, as FW-044 (A = 15 in). Each **£10. 8. 0.** c

FW-046
PILLAR TAP, three way, with movable swanneck. Inlet ½ in male. Two side bib taps, inlets ⅜ in male (A = 12 in, B = 6 in, C = 6 in, D = 5½ in). Each **£11. 6. 0.** c

FW-047
PILLAR TAP, three way, as FW-046 (A = 15 in). Each **£11. 8. 0.** c

FW-048
PILLAR TAP, three way. One centre bib tap, inlet ⅜ in male. Two side angle taps, inlets ⅜ in male. (A = 12 in, B = 5½ in, C = 6 in, D = 4¼ in). Each **£11. 9. 0.** c

FW-049
PILLAR TAP, three way. Three bib taps, inlets ⅜ in male (A = 12 in, C = 6 in, D = 5½ in). Each **£11. 9. 0.** c

FW-050
WATER TAP, three way. For screwing to bench standard or pipe mounting. Centre bib tap, inlet ½ in male. Two side angle taps, inlets ⅜ in male, fitted with removable wing nuts and nozzles. (Bib tap D = 5½ in). Each **£7. 17. 0.** c

FW-054
PILLAR TAP, two way, with movable swanneck. Inlet ½ in male. One side bib tap, inlet ⅜ in male. This fitting can be supplied opposite hand to special order (A = 12 in, B = 6 in, D = 5½ in) ... Each **£8. 12. 0.** c

FW-056
PILLAR TAP, two way, as FW-054 (A = 15 in). Each **£8. 12. 0.** c

FW-058
SWIVEL ARM, jet spray tap. Inlet ½ in male. Length of arm 10 in; overall lentgh 14 in ... Each **£7. 16. 6.** c

Dimension code see page 354.

All items on this page normally available from stock.

WATER FITTINGS

VERTICAL SURFACE MOUNTING

FW-060

WATER TAP, with three bib taps. Inlet $\frac{1}{2}$ in male. Inlets to taps screwed $\frac{3}{8}$ in male. Diamond way keyed base (D = $7\frac{1}{4}$ in) ... ... Each **£9. 15. 0.** c

FW-062

WATER TAP, with two bib taps. Inlet $\frac{1}{2}$ in male. Inlets to taps screwed $\frac{3}{8}$ in male. Diamond way keyed base (D = $7\frac{1}{4}$ in) ... ... Each **£6. 16. 0.** c

FW-064

PILLAR TAP, three way with movable swanneck. Inlet $\frac{1}{2}$ in male. Two side tap inlets $\frac{3}{8}$ in male. Diamond way keyed base. (A = 6 in, B = 6 in, D = $7\frac{1}{4}$ in). Each **£11. 5. 0.** c

FW-066

MIXING TAP, with swivel swanneck. Inlets $\frac{1}{2}$ in male. Diamond way keyed base. (A = 6 in, B = $7\frac{1}{2}$ in, C = 7 in). Many water authorities will not permit connection to mains supply ... Each **£7. 11. 0.** c

FW-067

VERTICAL MOUNTED SCREWED TAIL. To adapt pipe mounting taps, screwed $\frac{3}{8}$ in male, for vertical mounting. Inlet $\frac{1}{2}$ in male, diamond way keyed base. (D = 4 in) ... Dozen **£20. 10. 0.** Each **£1. 17. 0.** c

FW-068

VERTICAL MOUNTING SCREWED TAIL. As FW-067 but for use with taps screwed $\frac{1}{2}$ in male. (D = 4 in) ... ... Dozen **£20. 10. 0.** Each **£1. 17. 0.** c

FW-069

WATER TAP, three way. Inlet $\frac{1}{2}$ in male. Diamond way keyed base. Centre bib tap, inlet $\frac{1}{2}$ in male. Two side angle taps, inlet $\frac{3}{8}$ in male, fitted with removable wing nuts and nozzles. (Bib tap D = $5\frac{1}{2}$ in). Each **£8. 5. 0.** c

FW-070

PILLAR TAP, with movable swanneck. Inlet $\frac{1}{2}$ in male. Diamond way keyed base (A = 6 in, B = $4\frac{1}{2}$ in). Unless otherwise specified, this fitting is supplied with right hand control ... ... Each **£5. 0. 0.** c

FW-071

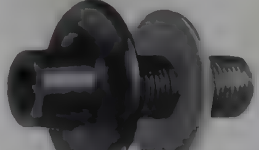
PILLAR TAP, fold down, with movable swanneck. Inlet $\frac{1}{2}$ in male. Flanged base plate. (A = 6 in, B = $4\frac{1}{2}$ in). Each **£8. 0. 0.** c

FW-060

FW-062

FW-064

FW-066


FW-067
FW-068

FW-069

FW-070

FW-071

Dimension code see page 354.

All items on this page normally available from stock.

PVC WATER FITTINGS

Inlet connection

FW-080

FW-082

FW-084

FW-088

FW-086

FW-090

FW-092

Service fittings designed for demineralised and distilled waters, and other corrosive waters such as brine and sea water. Metal parts are not in contact with the supply liquid, thus ensuring no metallic pick-up or corrosion.

A diaphragm valve is used for control, with plastics handwheel and coded disk.

Details of inlet connections
PVC tube through base. Metal base with ¾ in BSP shank and back nut. Diamond way keyed base 1⅛ in A/F. ½ in BSP connecting thread on PVC tube.

FW-080
PILLAR TAP, with fixed swanneck. Inlet ½ in male, outlet corrugated nozzle. Diamond way keyed base (A = 12 in, B = 6 in) ... ... Each **£8.15. 0.** c

FW-082
PILLAR TAP, inlet ½ in male, outlet corrugated nozzle. Diamond way keyed base (A = 6 in, B = 5½ in).
Each **£6.10. 0.** c

FW-084
WATER STANDARD, with two angle taps. Standard inlet ½ in male (A = 6 in, B = 5½ in).
Each **£13.12. 0.** c

FW-086
SINGLE OUTLET, vertical mounting. Inlet ½ in male, outlet corrugated nozzle, diamond way keyed base (D = 5½ in) ... ... Each **£5.10. 0.** c

FW-088
SWANNECK, bench mounting, inlet ½ in male, outlet corrugated nozzle. Diamond way keyed base (A = 6 in, B = 6 in) ... ... Each **£5. 0. 0.** c

FW-090
SWANNECK, vertical mounting, inlet ½ in male, outlet corrugated nozzle. Diamond way keyed base (B = 4½ in) ... ... Each **£4. 6. 0.** c

FW-092
WATER TAP, extended spindle front control. Adjustable for lengths between 20 in and 30 in inlet and outlet screwed ½ in female ... ... Each **£7.18. 6.** c

Dimension code see page 354.

All items on this page normally available from stock.

COMPRESSED AIR, VACUUM AND STEAM FITTINGS

PIPE MOUNTING

FW-094

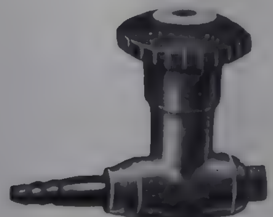
COMPRESSED AIR VALVE, inlet ¼ in male, outlet serrated nozzle. Dozen **£28. 0. 0.** Each **£2.11. 0.** c

FW-095

STEAM VALVE, inlet ¼ in male, outlet serrated nozzle. Dozen **£29.10. 0.** Each **£2.13. 0.** c

FW-096

VACUUM DIAPHRAGM VALVE, inlet ¼ in male, outlet serrated nozzle. Dozen **£24. 0. 0.** Each **£2. 4. 0.** c


FW-094
FW-095

FW-096

BENCH MOUNTING

FW-097

COMPRESSED AIR VALVE, flange fitting, inlet ¼ in male, diamond keyed base. Outlet serrated nozzle. Dozen **£29.10. 0.** Each **£2.13. 0.** c

FW-098

STEAM VALVE, swanneck standard, inlet ¼ in male, diamond keyed base. Outlet serrated nozzle. (A = 4 in, B = 4½ in) ... Dozen **£50. 0. 0.** Each **£4.10. 0.** c

Dimension code see page 354.

FW-099

VACUUM DIAPHRAGM VALVE, inlet ¼ in male, diamond keyed base. Outlet serrated nozzle. Dozen **£29.10. 0.** Each **£2.13. 0.** c

FW-097
FW-101

FW-098

FW-099

VERTICAL SURFACE MOUNTING

FW-100

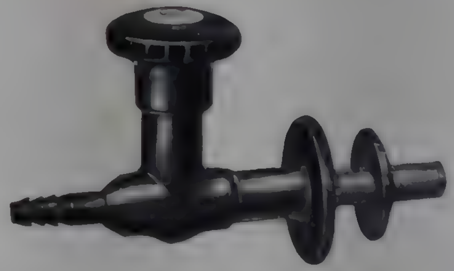
COMPRESSED AIR VALVE, inlet ¼ in male, diamond keyed base. Outlet serrated nozzle. Dozen **£36. 0. 0.** Each **£3. 6. 0.** c

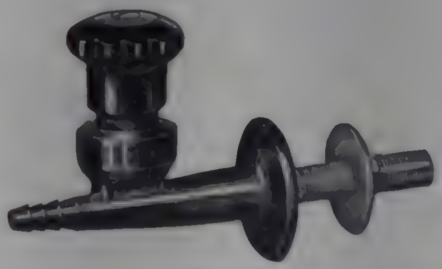
FW-101

STEAM VALVE, as FW-098. Dozen **£35. 0. 0.** Each **£3. 4. 0.** c

FW-102

VACUUM DIAPHRAGM VALVE, inlet ¼ in male, diamond keyed base. Outlet serrated nozzle. Dozen **£32. 0. 0.** Each **£2.18. 0.** c


FW-100


FW-102

SERVICE STOPCOCK

FW-106

GLOBE VALVES, bronze, fitted removable disks in asbestos composition, suitable for steam, air, oil or water. Working pressure 200 lb/in².

Screwed female ends	¼	⅜	½	¾	1 in	
Each	21/-	21/-	26/6	35/-	49/-	*m*

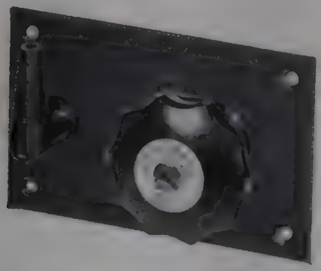
FW-106

All items on this page normally available from stock.

FRONT CONTROLLED SERVICE FITTINGS

Combined control head and outlet nozzle suitable for front panel mounting.

FW-110



FW-111
FW-112

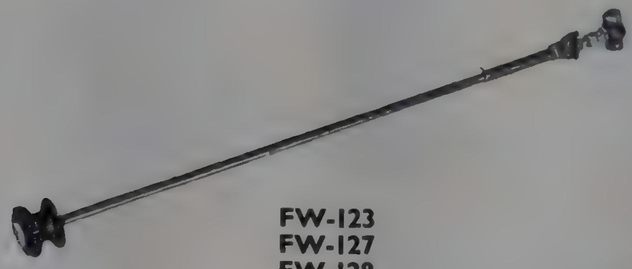
FW-110
GAS COCK, inlet ¼ in female. Integral nozzle mounted on 4×2½ in back plate.
Dozen **£44. 0. 0.** Each **£4. 0. 0.** c

FW-111
VACUUM DIAPHRAGM VALVE, inlet ¼ in female integral nozzle mounted on 4 in×2½ in back plate.
Dozen **£44. 0. 0.** Each **£4. 0. 0.** c

FW-112
COMPRESSED AIR VALVE, inlet ¼ in female. Integral nozzle mounted on 4×2½ in back plate.
Dozen **£60. 10. 0.** Each **£5. 10. 0.** c

Extended spindle type, adjustable for lengths 20 to 30 in. Cocks and valves complete with black bench bearing bush, handwheel and coloured service insert.

FW-122



FW-123
FW-127
FW-128

FW-126

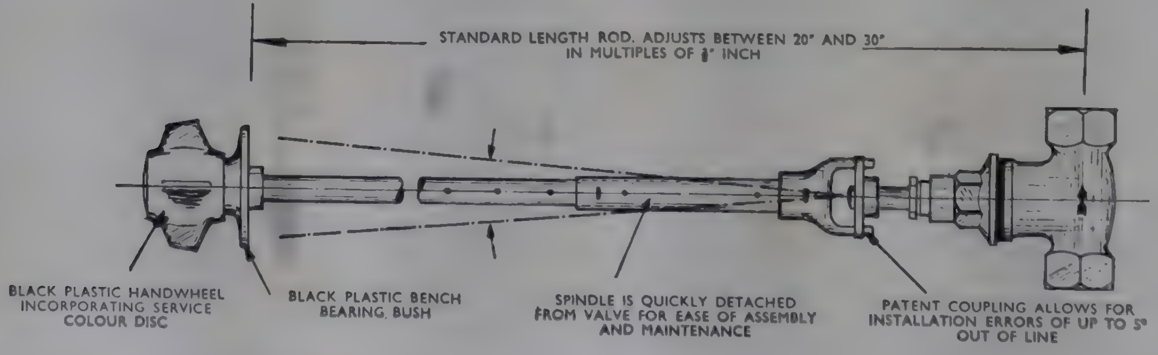
FW-122
WATER TAP, inlet and outlet ½ in female.
Dozen **£30. 0. 0.** Each **£2. 14. 0.** c

FW-123
STEAM VALVE, inlet and outlet ¼ in female.
Dozen **£52. 0. 0.** Each **£4. 14. 0.** c

FW-126
GAS COCK, inlet and outlet ¼ in female.
Dozen **£27. 10. 0.** Each **£2. 10. 0.** c

FW-127
VACUUM DIAPHRAGM VALVE, inlet and outlet ¼ in female ... Dozen **£37. 0. 0.** Each **£3. 6. 0.** c

FW-128
COMPRESSED AIR VALVE, inlet and outlet ¼ in female... ... Dozen **£49. 0. 0.** Each **£4. 8. 0.** c


STANDARD LENGTH ROD. ADJUSTS BETWEEN 20" AND 30" IN MULTIPLES OF ⅛" INCH
BLACK PLASTIC HANDWHEEL INCORPORATING SERVICE COLOUR DISC
BLACK PLASTIC BENCH BEARING BUSH
SPINDLE IS QUICKLY DETACHED FROM VALVE FOR EASE OF ASSEMBLY AND MAINTENANCE
PATENT COUPLING ALLOWS FOR INSTALLATION ERRORS OF UP TO 5° OUT OF LINE

All items on this page normally available from stock.

FRONT CONTROLLED SERVICE FITTINGS

Pipe connection type for front panel mounting

FW-140

WATER FITTING, inlet ⅜ in BSP male, outlet ⅜ in BSP male, mounted on 4×2½ in back plate.
Dozen **£42. 0. 0.** Each **£3.16. 0.** c

FW-141

STEAM VALVE, inlet and outlet ¼ in female, mounted on 4×2½ in back plate.
Dozen **£54. 0. 0.** Each **£4.18. 0.** c

FW-142

COMPRESSED AIR VALVE, as FW-141.
Dozen **£54. 0. 0.** Each **£4.18. 0.** c

FW-143

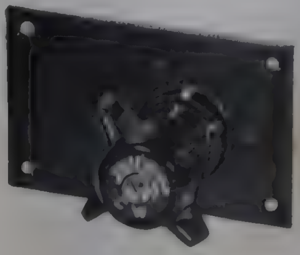
GAS COCK, inlet and outlet ¼ in female, mounted on 3¼×2½ in back plate.
Dozen **£33. 0. 0.** Each **£3. 0. 0.** c

FW-144

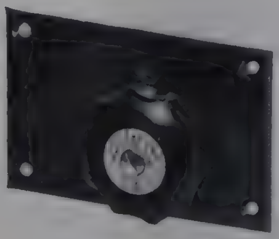
VACUUM DIAPHRAGM VALVE, inlet and outlet ¼ in female, mounted on 4×2½ in back plate.
Dozen **£50. 0. 0.** Each **£4.10. 0.** c

FW-145

WATER FITTING, cold or hot, foot pedal operated. Self closing non-concussive valve. Flange drilled for floor or panel fixing. Inlet and outlet at back of valve has unions for ½ in copper tube. Chromium plated finish.
Each **£4. 4. 0.** *mN*

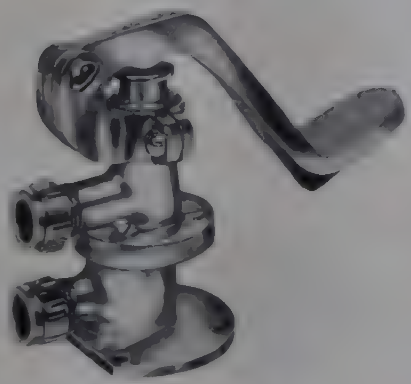


FW-140



FW-141
FW-142
FW-144

FW-143



FW-145

NOZZLES FOR FRONT CONTROLLED SERVICE FITTINGS

Swannecks and nozzles colour coded to match disk inserts on control heads.
When ordering the service should be specified for the correct colour to be supplied.

FW-150

SWANNECK, bench mounting, inlet ½ in male, for use with front control water fittings. Inlet ¼ in male for steam fittings. Dozen **£32. 0. 0.** Each **£2.18. 0.** c

FW-151

SWANNECK, vertical mounting, inlet ½ in male, for use with front control water fittings. Inlet ¼ in male for steam fittings. Dozen **£31. 0. 0.** Each **£2.16. 0.** c

FW-152

SWANNECK, vertical mounting, as FW-151 but having 4½ in standout.
Dozen **£31. 0. 0.** Each **£2.16. 0.** c

FW-155

NOZZLE, bench mounting, inlet ¼ in male, for use with front control gas, air and vacuum fittings.
Dozen **£17. 0. 0.** Each **£1.11. 0.** c

FW-156

NOZZLE, vertical mounting, inlet ¼ in male, for use with front control gas, air and vacuum fittings.
Dozen **£14. 5. 0.** Each **£1. 6. 0.** c

FW-151

FW-150

FW-155

FW-156

Items on this page normally available from stock except those coded *N.*

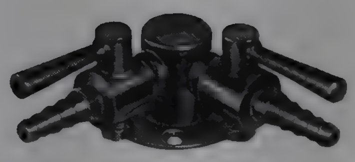
GAS FITTINGS

BENCH MOUNTING

ECONOMY RANGE **STANDARD RANGE**

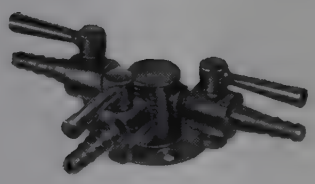
FW-177

FW-178

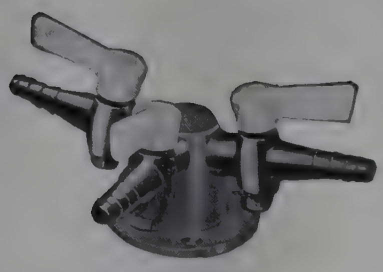


FW-179

FW-180



FW-183



FW-184

FW-185

FW-186

FW-177
GAS COCK, single way, lever handle, screwed ¼ in female ... ... Dozen **£10.15. 0.** Each **£0.19. 6.** c

FW-178
GAS COCK, single way, colour coded lever handle, screwed ¼ in female.
Dozen **£14.15. 0.** Each **£1. 7. 0.** c

FW-179
GAS COCK, two way 90°, lever handles, screwed ¼ in female ... ... Dozen **£16.10. 0.** Each **£1.10. 0.** c

FW-180
GAS COCK, two way 90°, colour coded lever handles, screwed ¼ in female.
Dozen **£21. 0. 0.** Each **£1.18. 0.** c

FW-181
GAS COCK, two way 180°, lever handles, screwed ¼ in female ... ... Dozen **£16.10. 0.** Each **£1.10. 0.** c

FW-182
GAS COCK, two way 180°, colour coded lever handles, screwed ¼ in female.
Dozen **£21. 0. 0.** Each **£1.18. 0.** c

FW-183
GAS COCK, three way, lever handles, screwed ¼ in female ... ... Dozen **£22. 0. 0.** Each **£2. 0. 0.** c

FW-184
GAS COCK, three way, colour coded lever handles, screwed ¼ in female.
Dozen **£27.10. 0.** Each **£2.10. 0.** c

FW-185
GAS COCK, four way, lever handles, screwed ¼ in female ... ... Dozen **£28.10. 0.** Each **£2.12. 0.** c

FW-186
GAS COCK, four way, colour coded lever handles, screwed ¼ in female.
Dozen **£34. 0. 0.** Each **£3. 2. 0.** c

All items on this page normally available from stock.

GAS FITTINGS

PIPE MOUNTING

FW-187

GAS COCKS, single way, lever handle.

Screwed	⅛	¼ in male	
Dozen	120/–	130/–	c
Each	11/–	11/9	

FW-188

GAS COCK, two way, lever handles, screwed ¼ in male.
Dozen **£20. 10. 0.** Each **£1. 17. 0.** c

VERTICAL SURFACE MOUNTING

FW-189

GAS COCK, single way, diamond way keyed base, inlet ¼ in male ... Dozen **£16. 10. 0.** Each **£1. 10. 0.** c

FW-190

GAS COCK, two way, diamond way keyed base, inlet ¼ in male ... Dozen **£25. 10. 0.** Each **£2. 6. 0.** c

SAFETY DROP FAN TAPS

FW-200

GAS COCK, pipe mounting, single way, drop lever, screwed ¼ in male.
Dozen **£9. 15. 0.** Each **£0. 17. 6.** c

FW-202

GAS COCK, bench mounting, single way, drop lever, screwed ¼ in female.
Dozen **£18. 10. 0.** Each **£1. 14. 0.** c

FW-204

GAS COCK, bench mounting, two way, 90° drop lever, screwed ¼ in female.
Dozen **£28. 0. 0.** Each **£2. 11. 0.** c

FW-206

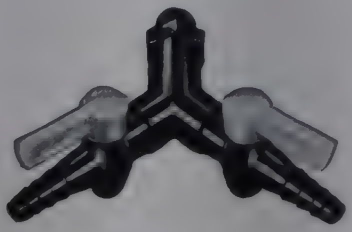
GAS COCK, bench mounting, as FW-204 but three way, cocks 90° apart. Screwed ¼ in female.
Dozen **£34. 0. 0.** Each **£3. 2. 0.** c

FW-208

GAS COCK, bench mounting, as FW-204 but four way, cocks 90° apart. Screwed ¼ in female.
Dozen **£41. 0. 0.** Each **£3. 14. 0.** c

STANDARD RANGE

FW-187


FW-188

FW-190

FW-200

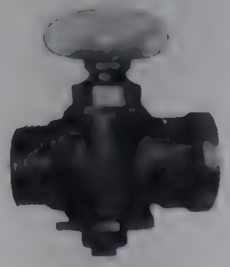
FW-204

GAS CONTROL COCKS

FW-210

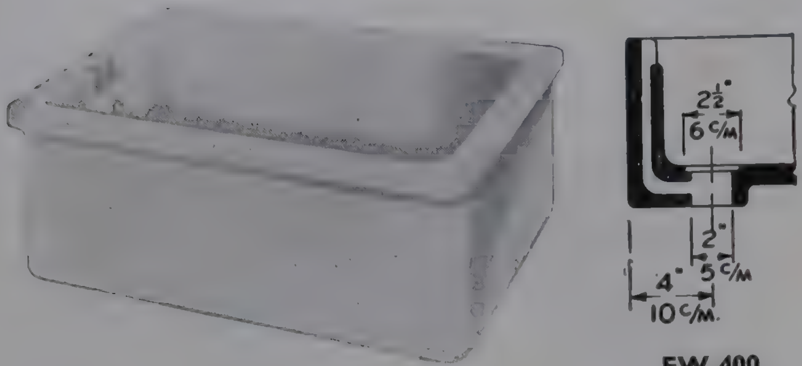
GAS STOPCOCKS, brass.

Screwed	½	¾	1 in	
Each	11/–	15/6	26/–	m


FW-210

All items on this page normally available from stock.

SINKS



FW-400

FW-400

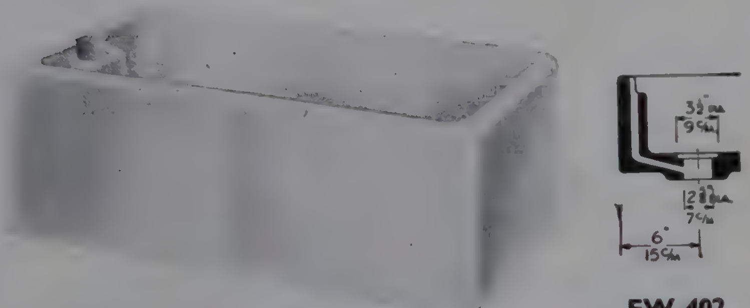
SINKS, white vitreous glazed fireclay, with ½ in rim projection all round, and 2½ in flanged outlet with combined open weir overflow in centre at one end. White inside and out.
Overall sizes. Length and width measured under rim.

Size	8×6×6	10×8×6	12×10×6 in	
Each	£3. 12. 3.	£3. 12. 3.	£3. 12. 3.	m
Size	12×12×6	16×11×6	17×13×6 in	
Each	£3. 19. 0.	£3. 19. 0.	£3. 19. 0.	m
Size	20×12×6		23×14×8 in	
Each	£3. 19. 0.		£6. 8. 3.	m

ACCESSORY

FW-401 Straps, metal, to support sinks FW-400 up to size 17×13×6 in, and histology sink No. FW-405, under bench top ... ... Pair **£0. 12. 6.** *m*

Sinks larger than 17×13×6 in should be supported on wood bearers or stools. Full details and prices on application.

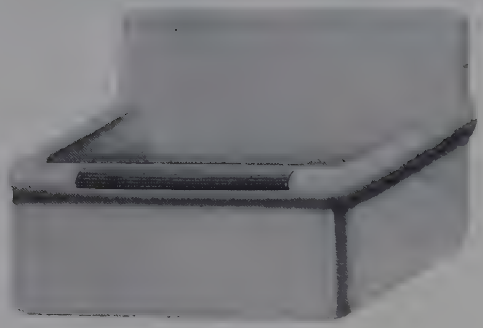


FW-402

FW-402

SINKS, white vitreous glazed fireclay, with 3½ in flanged outlet and combined open weir overflow in centre at one end. White inside and out. Overall sizes.

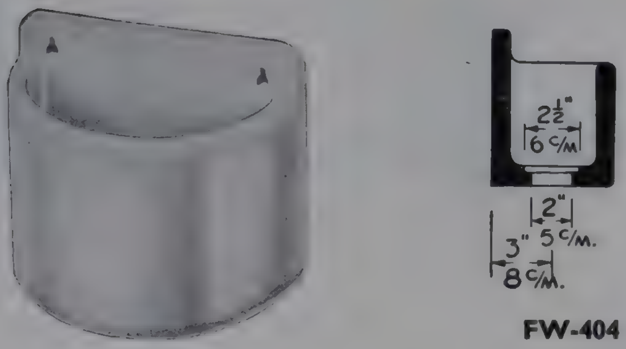
Size	18×15×8	21×16×8	24×16×8 in	
Each	£4. 2. 0.	£5. 2. 9.	£5. 2. 9.	m
Size	24×18×8		30×18×8 in	
Each	£5. 9. 6.		£10. 3. 3.	m
Size	21×16×10	24×16×10	24×18×10 in	
Each	£6. 3. 6.	£6. 3. 6.	£6. 10. 3.	m
Size	27×18×10	30×18×10	30×20×10 in	
Each	£8. 11. 3.	£10. 3. 3.	£11. 2. 0.	m
Size	36×18×10	36×20×10	36×24×10 in	
Each	£12. 1. 6.	£12. 13. 3.	£16. 13. 0.	m
Size	42×24×10		36×24×12 in	
Each	£21. 13. 9.		£21. 13. 9.	m



FW-403

FW-403

SINK, white vitreous glazed fireclay inside and out, with roll edge and 6 in high back skirting having holes for wall fixing. Outlet 3½×2½ in at centre rear. Size 12×10×6 in ... ... Each **£8. 5. 0.** *m*



FW-404

FW-404

SINK, white vitreous glazed fireclay inside and out, with 1½ in high back skirting and two holes for wall fixing. Outlet 2½×2 in in centre of sink. Size 10½×6×6 in.
Each **£5. 15. 3.** *m*

FW-405

FW-405

SINK, histology, black vitreous glazed fireclay inside and out, with external rim projection ½ in all round, integral overflow, and water inlet fitting on one side. Outlet 2½×2 in. Size 12×10×6 in.
Each **£7. 0. 0.** *m*

All items on this page normally available from stock.

WASH-HAND BASIN

FW-406

WASH-HAND BASIN, white vitreous glazed china, 26×18 in, with lefthand soap dish and recessed outlet ... ... Each **£8.19. 6.** *m*

FW-407

CANTILEVER BRACKETS, set of two, semi-concealed, cast iron, to screw on to wall ... Set **£1.16. 3.** *m*

FW-408

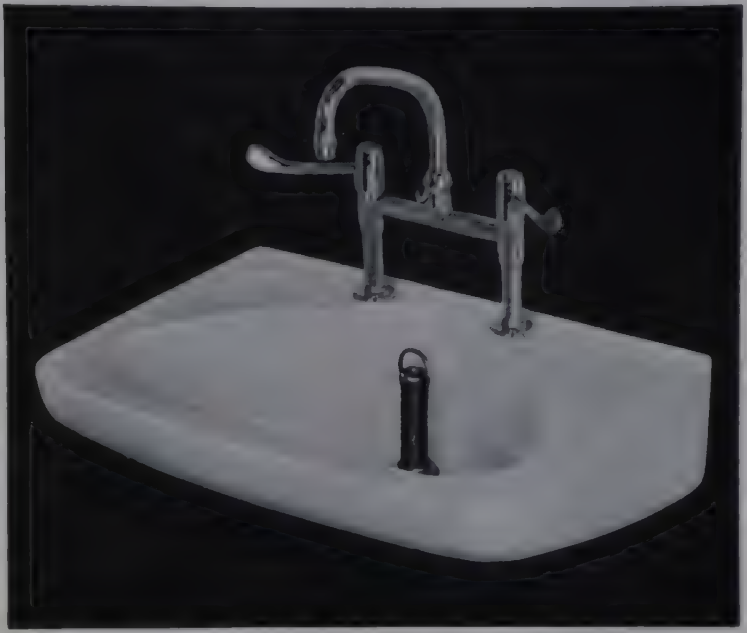
WASTE OUTLET, 1¼ in, chromium plated brass, with standing tube... ... ... Each **£3. 4. 0.** *m*

FW-409

BOTTLE TRAP, 1¼ in, chromium plated brass. Each **£2. 3. 3.** *m*

FW-410

WATER STANDARD, swanneck, for mixing hot and cold water. ½ in male inlets at 8 in centres, sprayrose outlet. Wrist action lever handles. Chromium plated brass ... ... Each **£12.10. 0.** *m*



FW-406 to FW-410

STAINLESS STEEL SINKS

FW-411

SINK BOWLS, seamless, pressed from 20 gauge FDP material. Internal corners radiused. Top edges have a 1 in wide flat flange all round. Satin polished finish inside and on face of flanges. All bowls have waste sinkage at the back centre, except size 9×14×7 in where it is centrally placed. Complete with 1½ in stainless steel outlet, plug, chain, and integral overflow, except for size 9×14×7 in which has a 1½ in stainless steel waste plug and chain only.

Size	9×14×7	17×14×7	20×14×7	21×15×8 in	
Each	£11.15. 0.	£13. 0. 0.	£13.15. 0.	£15.10. 0.	*m*

Stainless steel sink and draining board assemblies can also be supplied. Sizes range from 3 ft 6 in×1 ft 6 in to 8 ft×1 ft 9 in. Sinks can also be supplied in pairs for washing and rinsing, with or without draining boards. Full details and prices on application.

FW-411

RECEIVERS

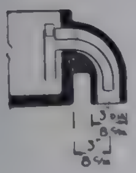
FW-420

RECEIVERS, vitreous glazed fireclay, white inside and out. With polythene siphon insert, and integral fireclay outlet horn.

External size	12×8×7	11×11×11 in	
Each	£5.18. 9.	£7.13. 3.	*m*

External size	13×13×13 in	
Each	£8.12. 9.	*m*

FW-420



FW-421

Spare polythene siphon tube ... Each **£0.16. 9.** *m*

All items on this page normally available from stock.

RECEIVERS AND SINK FITTINGS

A separate brochure featuring the complete range of polythene bends, tees, connectors, etc. is available on request.

FW-424

FW-426
FW-427

FW-429

FW-428

FW-430
FW-431
FW-432

FW-436
FW-437

FW-433

FW-480
FW-482

All the polythene plumbing fittings have connections with a special Kauthene buttress type thread unless otherwise indicated. The standard size 1¼ in and 1½ in Kauthene thread will not match BSP screwed fittings; the appropriate Kauthene fitting must be used. Hot jointing of polythene pipe to the connectors is easily effected by use of fusion tools FW-512 and FW-514.

FW-424

CATCHPOT RECOVERY TRAP AND DILUTION RECEIVER, black polythene, 1¾ gallon capacity. Two inlets and single outlet screwed 1½ in Kauthene thread; complete with blank cap on one outlet. Suitable inlet and outlet connectors also adapter for 1¼ in thread available on request, see FW-426 to FW-429.
Each **£5. 12. 6.** *m*

FW-426

LOOSE NUT SOCKET INLET, black polythene, for pipe connection, screwed 1½ in Kauthene thread ... Each **£0. 5. 0.** *m*

FW-427

LOOSE NUT SOCKET INLET, black polythene, for pipe connection, screwed 1¼ in Kauthene thread ... Each **£0. 4. 6.** *m*

FW-428

COUPLER REDUCER, black polythene, 1½ in to 1¼ in.
Each **£0. 5. 0.** *m*

FW-429

ELBOW, black polythene, 90°, screwed 1½ in Kauthene thread.
Each **£0. 7. 0.** *m*

FW-430

WASTE OUTLET, vulcanite, screwed 1¼ in with 2½ in diameter flange. With stopper, strainer, fixing ring and brass nut for lead pipe. Slotted for overflow. Suitable for sinks FW-400 and FW-405.
Each **£1. 7. 6.** *m*

FW-431

WASTE OUTLET, vulcanite, as FW-430 but without slot for overflow. Suitable for sinks FW-404 and troughs FW-530.
Each **£1. 7. 6.** *m*

FW-432

WASTE OUTLET, vulcanite, screwed 1½ in with 3½ in diameter flange. With stopper, strainer, fixing ring and brass nut for lead pipe. Slotted for overflow. Suitable for sink FW-402.
Each **£1. 10. 0.** *m*

FW-433

WASTE OUTLET, vulcanite, screwed 1¼ in with 2½ in diameter flange. Complete with standing overflow tube, strainer, fixing ring and brass nut for lead pipe. Suitable for sink FW-404.
Each **£1. 12. 0.** *m*

FW-436

WASTE OUTLET, black polythene, 2½ in diameter flange, with stopper, strainer and shrouded backnut, also slotted for overflow. Screwed 1¼ in Kauthene thread, excluding pipe connector. Suitable for sinks FW-400 and FW-405 ... ... Each **£0. 8. 6.** *m*

FW-437

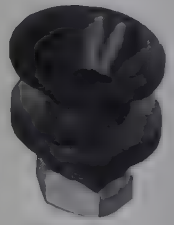
WASTE OUTLET, black polythene, 3½ in diameter flange, with stopper, strainer and shrouded backnut, also slotted for overflow. Screwed 1½ in Kauthene thread, excluding pipe connector. Suitable for sinks FW-402 ... ... Each **£0. 10. 0.** *m*

FW-480

WASTE OUTLET, black polythene, 2½ in diameter flange, complete with 5 in standing overflow tube with locating thread, strainer and shrouded backnut. Screwed 1¼ in Kauthene thread, excluding pipe connector. Suitable for sink FW-404.
Each **£0. 13. 0.** *m*

All items on this page normally available from stock.

DRIP WASTES


FW-490

FW-492

FW-482

WASTE OUTLET, black polythene, 3½ in diameter flange, complete with 7 in standing overflow tube with locating thread, strainer and shrouded backnut. Screwed 1½ in Kauthene thread, excluding pipe connector. Suitable for sinks FW-402.
Each **£0. 15. 6.** *m*

FW-484

WASTE OUTLET, black polythene, 3½ in diameter flange, complete with stopper, strainer and backnut. Short type for use with 'thin section' vessels, unslotted and may be drilled for slot on site. Screwed 1½ in Kauthene thread, excluding pipe connector.
Each **£0. 8. 6.** *m*

FW-494

FW-495

FW-490

DRIP WASTE, vulcanite, with 3 in diameter flange, complete with fixing ring and brass locking nut for lead pipe. For fixing flush in bench top beneath water tap. Screwed 1½ in BSP thread.
Each **£1. 10. 0.** *m*

FW-492

DRIP WASTE, black polythene, with 3 in diameter flange; complete with strainer and backnut but excluding pipe connector. Screwed 1½ in Kauthene thread ... ... Each **£0. 12. 6.** *m*

FW-494

DRIP WASTE, black polythene, with 4 in circular flange; complete with removable anti splash top to retain rubber or polythene tubes. Fitted large backnut but excluding pipe connector. Screwed 1½ in Kauthene thread ... ... Each **£0. 15. 6.** *m*

FW-495

DRIP WASTE, black polythene, circular with 6 in square flange. Complete with strainer and large backnut but excluding pipe connector. Screwed 1½ in Kauthene thread... Each **£2. 7. 6.** *m*

FW-496
FW-497

FW-496

DRIP WASTE, black polythene, oval cup overall 8 in × 4 in. Complete with strainer and retaining clips but excluding pipe connector. Screwed 1½ in Kauthene thread... Each **£1. 10. 0.** *m*

FW-497

DRIP CUP, black polythene, oval cup with rectangular flange overall 8 in × 4 in. Complete with strainer and retaining clips but excluding pipe connector. Screwed 1½ in Kauthene thread.
Each **£1. 12. 0.** *m*

FW-498
FW-499

FW-498

DRIP WASTE, bronze, screwed 1½ in having 4½ × 2½ in oval cup.
Each **£3. 0. 0.** c

FW-499

DRIP WASTE, bronze, screwed 1½ in having 7 × 3 in oval cup.
Each **£4. 2. 0.** c

All items on this page normally available from stock.

TRAP UNITS

FW-500
FW-502

FW-504
FW-506

FW-500

WASTE TRAP UNIT, black polythene, with detachable catchpot base, capacity 1 pint. Inlet **loose nut** coupler screwed 1¼ in Kauthene thread, outlet coupler screwed 1½ in Kauthene thread ... Each **£1. 3. 6.** *m*

FW-501

WASTE TRAP UNIT, black polythene, with detachable catchpot base, capacity 1 pint. Inlet with **fixed nut** coupler screwed 1¼ in BSP thread, outlet coupler screwed 1½ in Kauthene thread ... ... Each **£1. 1. 6.** *m*

FW-502

WASTE TRAP UNIT, black polythene, with detachable catchpot base, capacity 1 pint. Inlet and outlet fitted **loose nut** couplers, screwed 1½ in Kauthene thread. Each **£1. 4. 0.** *m*

FW-503

WASTE TRAP UNIT, black polythene, with detachable catchpot base, capacity 1 pint. Inlet with **fixed nut** coupler screwed 1½ in BSP thread, outlet coupler 1½ in Kauthene thread ... ... Each **£1. 2. 6.** *m*

FW-508
FW-510

FW-504

WASTE TRAP UNIT, black polythene, with detachable visual glass base. Inlet loose nut coupler screwed 1¼ in thread, outlet coupler screwed 1½ in thread. Each **£3. 17. 0.** *m*

FW-506

WASTE TRAP UNIT, black polythene, as FW-504, but inlet and outlet couplers screwed 1½ in. Each **£3. 17. 8.** *m*

FW-508

WASTE DILUTION TRAP, black polythene, with detachable visual borosilicate glass base 1 gallon capacity. Loose nut inlet coupler screwed 1¼ in thread. In 'P' form with outlet coupler ... ... Each **£5. 0. 9.** *m*

FW-510

WASTE DILUTION TRAP, black polythene, as FW-508, but loose nut inlet and outlet coupler screwed 1½ in thread ... ... Each **£5. 4. 3.** *m*

FW-514
FW-515

FW-514

FUSION TOOL, for hot jointing of polythene pipe to couplers, 1¼ in size ... ... Each **£1. 0. 0.** *m*

FW-515

FUSION TOOL, as above, but 1½ in size. Each **£1. 9. 0.** *m*

FW-516

PIPE, black polythene, normal gauge, internal diameter 1¼ in. Supplied cut to length required up to a maximum of 15 ft ... ... Foot **£0. 1. 9.** *m*

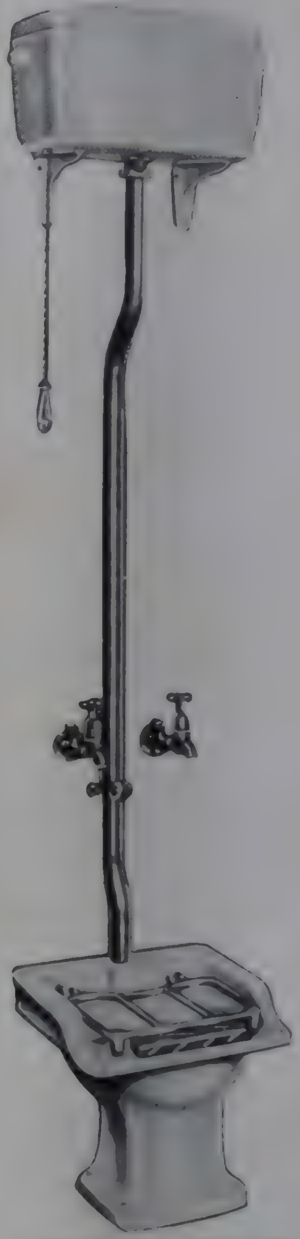
FW-518

PIPE, black polythene, as FW-516 but internal diameter 1½ in ... ... Foot **£0. 2. 6.** *m*

All items on this page normally available from stock.

WASTE DISPOSAL

SLOP SINK SUITE



FW-519 to FW-528

FW-519
SLOP SINK, white vitreous glazed fireclay, with 3 in back skirting and hardwood pad on front edge. Size 17 × 18 × 17 in with 'S' or 'P' trap, having white porcelain enamelled iron removable grid to outlet. Each **£25.10.10.** *m*

When ordering please state type of trap required.

FW-520
BUCKET GRATING, galvanised, complete with rubber buffers... ... ... Each **£2. 9. 6.** *m*

FW-526
BIB TAP, one pair, chrome plated brass, for hot and cold service; inlets screwed ½ in. Complete with wall mounting back plates ... ... Pair **£4. 3. 6.** *m*

FW-528
CISTERN, vitreous china, high level siphon type: 3 gallon capacity, ½ in ball valve; ¾ in overflow, chain pull through bottom of cistern. Complete with 1¼ in bore white enamelled flush pipe and white porcelain enamelled cast iron support brackets ... ... Each **£12.14. 0.** *m*

BENCH TROUGHS AND BOTTLE RACKS

FW-530
BENCH TROUGH, island type, ¼ in thick rigid unplasticised PVC; colour red or grey (state which required). Dimensions 36 in long × 4 in wide internally; 2 in high × 4 in high at stop end with recessed hole to accommodate waste outlet. Not including waste outlet. Each **£8.18. 6.** *f*

FW-530

TROUGHS, as above, can be supplied to alternative lengths as required; also, where specified, with back skirting for wall mounting. Price on application.

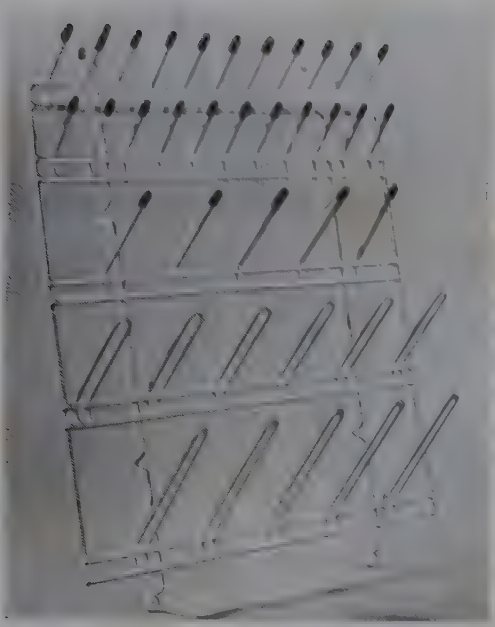
FW-532
WINCHESTER QUART BOTTLE RACK, ¼ in thick rigid unplasticised PVC; colour red or grey (state which required). To fit 3 ft wide cupboard and having two 6 in upstands ... ... Each **£11.19. 6.** *f*

FW-534
WINCHESTER QUART BOTTLE RACK, as FW-532 but to fit 3 ft 6 in wide cupboard ... Each **£14. 0. 0.** *f*

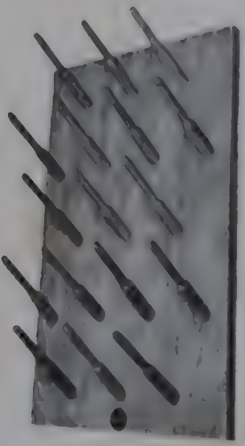
FW-532
FW-534

RACKS, as above, can be supplied to alternative lengths, as required. Price on application.

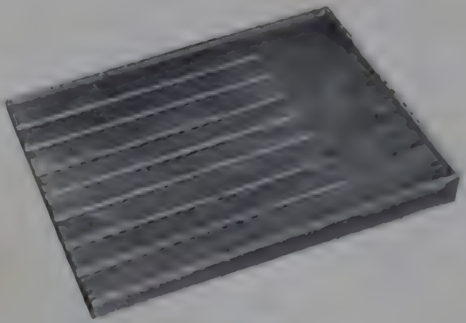
DRAINING BOARDS AND SPLASHBACKS



FW-550



FW-554



FW-558

FW-550

PEG DRAINING RACKS. Polythene coated metal frame with sloped pegs. Angled fitting members support the racks 1 in away from the wall surface.

Size	22×22	25×22 in	
Each	£4. 4. 0.	£4.18. 0.	*m*

FW-554

PEG DRAINING RACKS. Teak, with seventeen sloped pegs.

Size	24×15	30×24 in	
Each	£4. 0. 0.	£5.12. 0.	*m*

FW-558

DRAINING BOARDS. Teak, grooved.

Size	24×18	30×21	36×24 in	
Each	£3.16. 0.	£4. 6. 0.	£6. 0. 0.	*m*

LABORATORY ACCESSORIES

FW-630

FW-635

FW-637

FW-630

SAFE, wall fitting, bent steel welded body having lugs on the back. The bolt shoots behind the front rebate and the ¼ in thick door is hung on concealed pivots. Suitable for storage of platinum crucibles. External dimensions, 8¾ in wide × 4⅛ in deep × 3⅛ in high.

Each **£7. 0. 9.** *m*

FW-631

SAFE, wall fitting, as FW-630, but with a ⅜ in thick door. External dimensions, 8¾ × 4⅛ × 6¼ in high.

Each **£8.18. 8.** *m*

FW-635

BLACKBOARDS, oak framed, with specially prepared black writing surface on hardboard ground. Fitted with chalk trough.

Width	36	36	48 in	
Height	24	36	36 in	
Each	£5.16. 0.	£6.10. 0.	£8. 5. 0.	*m*

Writing surfaces can also be prepared from pigmented glass, with fine sandblast surface. Details and price on application.

FW-636

BLACKBOARD, 6 ft wide × 13 ft high overall. Two oak framed boards with black writing surfaces as FW-635, counterpoised in two stiles. Fitted with chalk trough.

Each **£66. 0. 0.** *mN*

FW-637

CARD FRAME, 3 × 1¾ in, made from black plastics. Suitable for labelling drawers and cupboards. Complete with 2¾ × 1 in white cards and black fixing screws.

Gross **£5. 2. 0.** Dozen **£0. 9. 6.** c

Items on this page normally available from stock except those coded *N*.

LABORATORY ACCESSORIES
(continued)

12
1
2
3
4
5
6
7
8
9
10
11

FW-638

FW-638

WALL CLOCK, electric, silver grey metal case having 9 in dial and sweep second hand. For 200/250V a.c. single phase supply ... ... Each **£7. 7. 0.** *m*

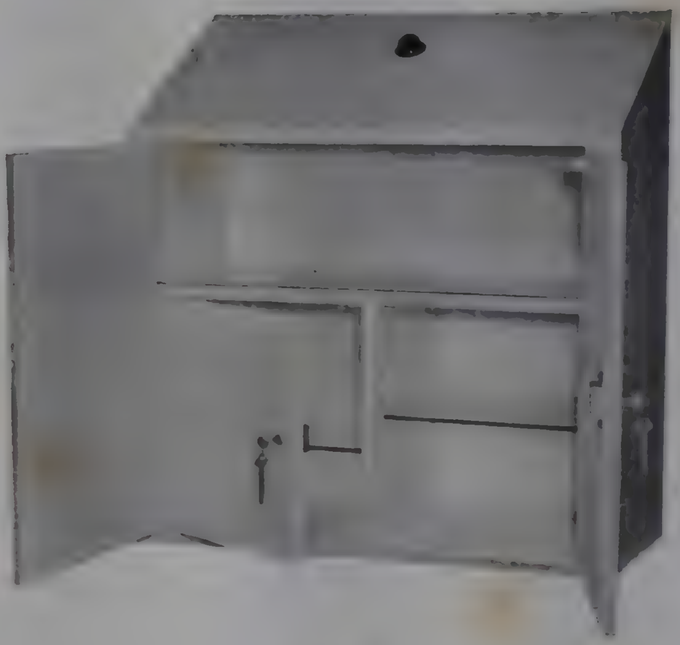
FW-640

WALL CLOCK, battery driven automatic, with 9 in dial and 4 jewel movement, similar appearance to FW-638 but without seconds hand. Operated by a standard No. 2 flash lamp battery normally lasting twelve months ... ... Each **£9. 15. 0.** *m*

LABORATORY SAFETY EQUIPMENT

FW-642

POISON CUPBOARD, of timber construction, for storage of poisons and dangerous drugs. In accordance with the requirements of BS 2881, 2 ft 7 in high × 2 ft 4 in wide × 11 in deep. Top inclined at angle of 30°. Outside and inside finished white cellulose lacquer. Interior fitted with full width shelf, covered Melamine plastics and two adjustable shelves of clear plate glass. An inner compartment, independently locked, is provided for storage of dangerous drugs, in accordance with the Dangerous Drug Regulations, and sited at lower left corner of cupboard. Each cupboard is fitted with three standard small bayonet cap lampholders to provide internal lighting and a red glass dome let into the roof as a warning light signal. All lights controlled by door operated switches. It is intended that 15W lamps be used and provided by the user. The internal wiring terminates in a 3 pole terminal block mounted inside the cupboard; a hole suitable for $\frac{3}{4}$ in conduit is provided for connection to the electricity supply ... ... Each **£41. 0. 0.** *mN*



FW-642

FW-644

POISON CUPBOARD, as above, but 2 ft 7 in high × 1 ft 6 in wide × 11 in deep ... ... Each **£35. 0. 0.** *mN*

FW-646

SAFETY SCREEN, 2 ft 3 in wide × 2 ft 6 in high, of $\frac{1}{4}$ in transparent technoplate, mounted in grey enamelled steel frame ... ... Each **£12. 5. 0.** *m*

CP-770 to CP-810	**Gloves**	For details and prices see entries in List No. sequence.
CP-830 to CP-890	**Eye protection**	
CP-898 to CP-978	**Respirators**	
FF-300 to FF-400	**Fire extinguishers**	
FF-460	**Fire bucket**	
FF-820 to FF-840	**First-aid cabinets**	

FW-646

Items on this page normally available from stock except those coded *N*.

TECHNOLITE

TECHNOLITE is a form of opaque vitreous glass with a finely polished surface. It is absolutely unaffected by the action of all alkalis and organic substances and all acids, with the exception of hydrofluoric acid. It is particularly suitable for use as a covering for reagent bottle shelves and the tops and backs of titration benches. In certain specialised cases, such as in food testing and bacteriological laboratories, it is effective as a bench top.

Technolite is supplied in both white and black and in thicknesses of $\frac{5}{16}$ in; the maximum size of a single sheet is 8 × 4 ft. When it is intended for use as a bench top the maximum size of any single sheet should not exceed 3 ft to 4 ft in width, so as to reduce the risk of fracture through strain or impact. Technolite should be protected by an asbestos mat where a burner or hotplate is being used.

FW-650

TECHNOLITE, rectangular sheet, white $\frac{5}{16}$ in thick.
Price on application. *m*

FW-652

TECHNOLITE, rectangular sheet, black $\frac{5}{16}$ in thick.
Price on application. *m*

NOTE: When enquiring or ordering, it is essential to supply details of dimensions of the material and the nature of the edgework required. This can be either: edges as cut, edges ground square, edges ground square and polished or edges rounded and polished. Combinations of this edgework can also be made on any one sheet or number of sheets.

Prices on application.

TECHNOPLATE

TECHNOPLATE is exactly as technolite in appearance and has all of its advantages, but with the added property of being able to withstand both considerable impact and heat. It is a toughened vitreous material and can be supplied either black or transparent. Its main use is in bases for fume cupboards (black) and safety screens (transparent). It is also used for bench tops for specialised work as described for technolite, but with obviously greater advantages. **Once manufactured, technoplate cannot be cut or altered.** The maximum size of a single sheet is 5 ft × 2 ft 6 in.

There is a tendency during processing for the sheets to warp slightly and where several sheets are butted together to form one large bench top there is a certain amount of difficulty in obtaining perfectly flush joints and some caulking with mastic is often required. Bench tops of this material perform well under arduous conditions and heavy corrosion, but one must be prepared to accept this small disadvantage which cannot be avoided.

FW-654

TECHNOPLATE, rectangular sheet, transparent, $\frac{1}{4}$ in thick.
Price on application. *m*

FW-655

TECHNOPLATE, rectangular sheet, black, $\frac{5}{16}$ in thick.
Price on application. *m*

FW-656

TECHNOPLATE, rectangular sheet, black, $\frac{3}{8}$ in thick.
Price on application. *m*

This material is supplied normally with the edges arrised only unless otherwise stated. It may be supplied with edgework as for technolite where this is required.

AE-082

ADHESIVE, *Bostik*, **'C'.** A powerful general purpose black adhesive. Suitable for technolite and black technoplate. Supplied in $\frac{1}{2}$ pt tins. For price see entry in List No. sequence.

ASBESTOLITE

ASBESTOLITE is a grey coloured material, being a compound of asbestos and cement. It is of high tensile strength, fire resisting and incombustible. In its natural state, asbestolite is resistant to normal spillage of diluted acids and most organic solvents and when coated with a suitable solution will resist most acids and alkalis. It is extensively used for fume cupboard and combustion hood bases and backs, also for laboratory bench tops, glass blowing tables and purposes where protection against heat is required.

Asbestolite is now available in two distinct grades to meet a wider field of application. Grade A is suitable for evenly distributed temperatures only, up to approx. 300°C; this is shown under FW-680 and FW-682. Grade B may be used in temperatures up to at least 800°C: this is shown under FW-690.

FW-680

ASBESTOLITE SHEETS, Grade A, 8 ft 3 in × 4 ft, natural finish. Tensile strength 4200 lb/in². For evenly distributed temperatures only, up to approx. 300°C.

Thickness	$\frac{1}{8}$ 3	$\frac{3}{16}$ 4·5	$\frac{1}{4}$ 6	$\frac{3}{8}$ in 9 mm	
Each	£5. 18. 0.	£7. 5. 0.	£8. 5. 0.	£11. 5. 0.	*m*
Thickness	$\frac{1}{2}$ 12·5	$\frac{5}{8}$ 16	$\frac{3}{4}$ 19	1 in 25 mm	
Each	£13. 0. 0.	£16. 10. 0.	£19. 10. 0.	£25. 0. 0.	*m*

FW-682

ASBESTOLITE SHEETS, 8 ft 3 in × 4 ft, as above but anti-acid treated finish.

Thickness	$\frac{1}{8}$ 3	$\frac{3}{16}$ 4·5	$\frac{1}{4}$ 6	$\frac{3}{8}$ in 9 mm	
Each	£10. 0. 0.	£11. 10. 0.	£12. 10. 0.	£15. 10. 0.	*m*
Thickness	$\frac{1}{2}$ 12·5	$\frac{5}{8}$ 16	$\frac{3}{4}$ 19	1 in 25 mm	
Each	£17. 0. 0.	£20. 10. 0.	£23. 10. 0.	£28. 10. 0.	*m*

The standard size sheet is 8 ft 3 in × 4 ft but panels can be supplied cut to any size required, within the dimensions of the sheet. Rebating, cutting out of sink holes, small squares, disks or rings can be carried out to order. Where sheet sizes or bench tops are required longer than a standard sheet, these must be made up from more than one sheet. Thicknesses of $\frac{3}{4}$ in and 1 in material can be supplied with rebated joints. Joints can be pointed with AE-060 acid resisting cement.

FW-690

ASBESTOLITE SHEETS, Grade B, 8 ft 3 in × 4 ft, natural finish. May be used in temperatures up to at least 800°C. For use where high or concentrated temperatures are present and suitable for use as palettes. Compression strength 7100 lb/in² minimum.

Thickness	$\frac{1}{4}$ 6	$\frac{5}{16}$ 8		$\frac{3}{8}$ in 9 mm	
Each	£12. 10. 0.	£15. 10. 0.		£20. 10. 0.	*m*
Thickness	$\frac{1}{2}$ 12·5	$\frac{5}{8}$ 16	$\frac{3}{4}$ 19	1 in 25 mm	
Each	£22. 10. 0.	£27. 10. 0.	£36. 0. 0.	£47. 0. 0.	*m*

AE-060

CEMENT, acid resisting, for jointing asbestolite piping and bench tops, fireclay and stoneware troughs and pipes, etc. Supplied in a tin with a separate tin of solvent solution, and full directions for use. For details and price see entry in List No. sequence.

GAS ANALYSIS

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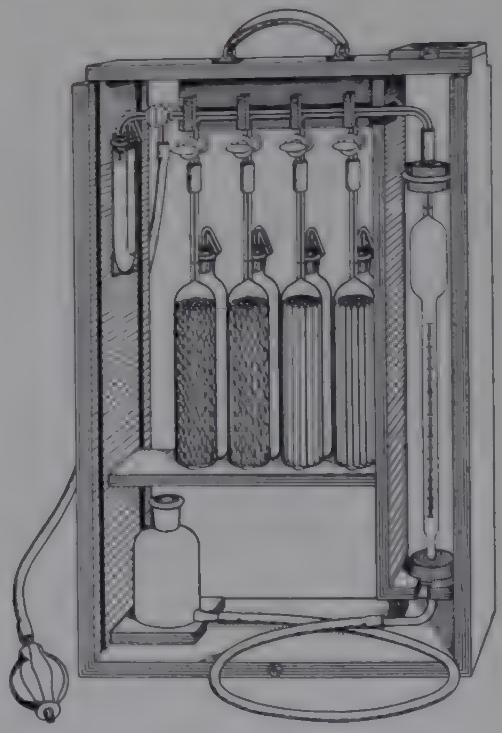
Gallenkamp ORSAT GAS ANALYSER

BRITISH STANDARD PATTERN as described in BS 1756 Part 2
'Sampling and analysis of flue gases'

GC-020

GAS ANALYSER, Orsat, *Gallenkamp*, to BS 1756 Part 2, for the determination of CO, CO_2 and O_2 in flue gases, etc. With burette GC-030, two absorption vessels GC-040, and two absorption vessels GC-042, in portable polished wood case with removable front and back. Dimensions 53 × 37 × 16·5 cm ... Each £26. 5. 0. *b*



GC-020

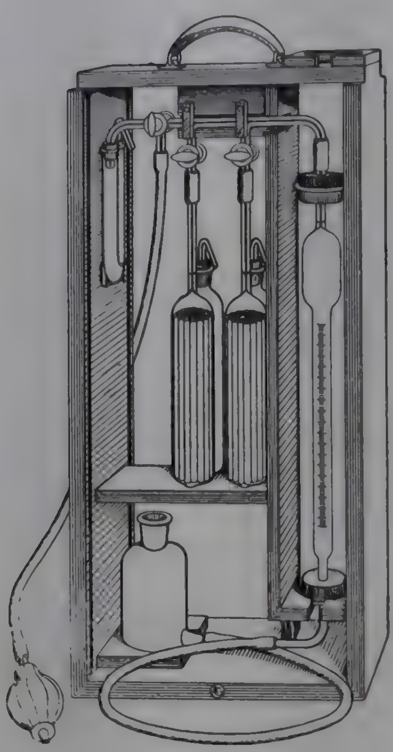
NOTE: The component parts of this apparatus are not interchangeable with Orsat apparatus GC-100 to GC-120. Spare components should be ordered under the following numbers.

REPLACEMENT PARTS

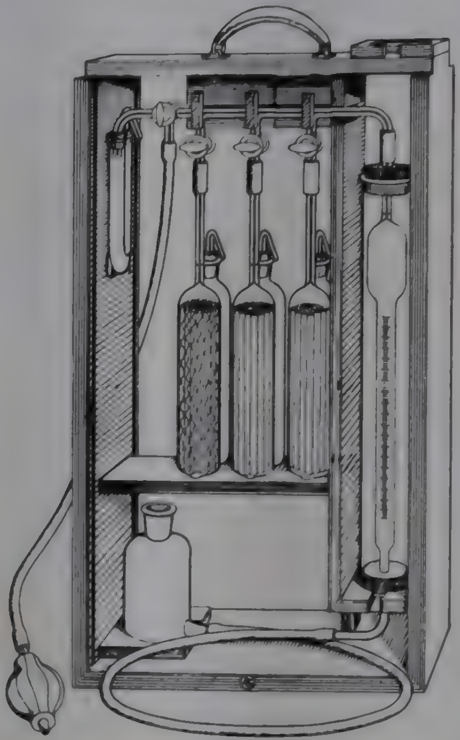
GC-030	**Burette,** *Technico*, Class B, capacity 100 cm³, with 70 cm³ in the bulb and 30 cm³ in the tube which is graduated in 0·2 cm³	Each £2. 2. 0.	*a*
GC-034	**Burette jacket** for burettes GC-030 and GC-032.	Each £0. 12. 0.	*a*
GC-040	**Absorption vessel,** filled with thin wall glass tubes.	Each £1. 13. 0.	*a*
GC-042	**Absorption vessel,** as GC-040 but for use with cuprous chloride absorbent, each glass tube containing a spiral of copper wire	Each £1. 16. 0.	*a*
GC-044	**Stopcock manifold,** with four side stopcocks, and T-bore end stopcock	Each £4. 16. 0.	*a*
GC-046	**Levelling bottle,** 125 ml	Each £0. 8. 6.	*d*

All items on this page normally available from stock.

Gallenkamp ORSAT GAS ANALYSERS



GC-100



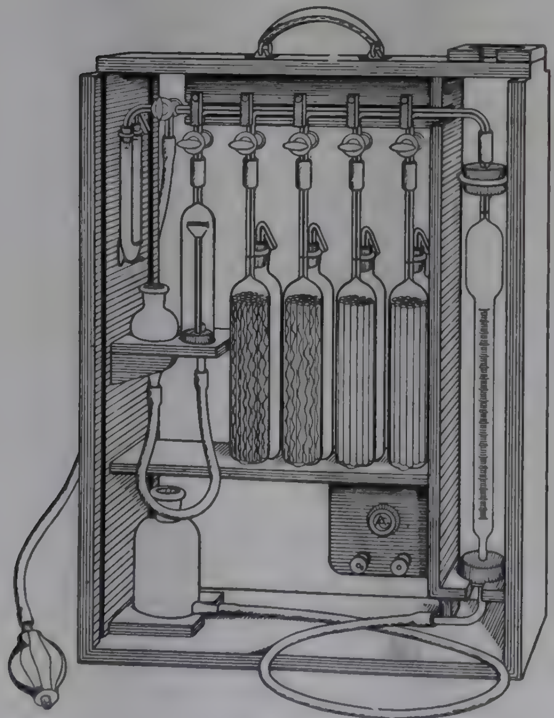
GC-110

GC-100

GAS ANALYSER, Orsat, *Gallenkamp*, for the determination of CO_2 and O_2 in flue gases, etc. With burette and two absorption vessels, GC-170 with filling tubes GC-171, in portable polished wood case with removable front and back. Dimensions 58 × 28 × 16·5 cm. **See Note below** ... ... Each **£18. 3. 6.** *b*

GC-110

GAS ANALYSER, Orsat, *Gallenkamp*, for the determination of CO_2 and O_2 and the approximate estimation of CO in flue gases, etc. With burette, three absorption vessels GC-170, 2 sets of filling tubes GC-171 and 1 set GC-173, in portable polished wood case with removable front and back. Dimensions 60 × 34 × 16·5 cm. **See Note below** ... ... Each **£21. 2. 6.** *b*



GC-120

GC-120

GAS ANALYSER, Orsat, *Gallenkamp*, for the determination of CO, CO_2, O_2 and H_2 in flue gases, etc. With four absorption vessels GC-170, with 2 sets of filling tubes GC-171 for CO_2 and O_2, and 2 sets GC-173 for CO, and a Harden type slow combustion pipette GC-178 for determination of H_2, CH_4, etc., in portable polished wood case with removable front and back. With rheostat and terminals for battery connection **but without battery.** Dimensions 60 × 43 × 16·5 cm. **See Note below.**

Each **£33. 2. 6.** *b*

Suitable battery; *Ever Ready* No. 126 or *Siemens* No. B6.

NOTE: Apparatus GC-100 to GC-120 are normally supplied with burette GC-150 unless otherwise ordered. They can, on request, be supplied with any of the burettes GC-150, GC-152, GC-154 as listed on the next page. The absorption vessels for O_2 and CO_2 can also be replaced by the Shepherd type vessel with improved fritted glass distributor if required.

All items on this page normally available from stock.

Gallenkamp ORSAT GAS ANALYSERS

COMPONENT PARTS AND ACCESSORIES

for apparatus GC-100, GC-110, GC-120

GC-150
BURETTE, *Technico*, capacity 100 cm³ of which 60 cm³ is contained in the bulb and 40 cm³ in the tube graduated in 0·2 cm³ ... ... Each **£1. 10. 0.** *a*

GC-151
BURETTE, *Technico*, as GC-150 but fitted with jacket GC-156 using rubber stoppers ... Each **£2. 19. 0.** *a*

GC-152
BURETTE, *Technico*, as GC-150 but with 75 cm³ in the bulb and 25 cm³ in the tube graduated in 0·2 cm³. Each **£1. 13. 0.** *a*

GC-153
BURETTE, *Technico*, as GC-152 but fitted with jacket GC-156 using rubber stoppers ... Each **£3. 2. 0.** *a*

GC-154
BURETTE, *Technico*, cylindrical, capacity 100 cm³. With tube graduated in 0·5 cm³ over whole length. Each **£1. 10. 0.** *a*

GC-155
BURETTE, *Technico*, as GC-154 but fitted with jacket GC-156 using rubber stoppers ... Each **£2. 19. 0.** *a*

GC-156
BURETTE JACKET, (AG), for burettes GC-150, GC-152 and GC-154 ... ... Each **£0. 13. 6.** *a*

GC-170
ABSORPTION VESSEL, (AG), for use with filling tubes GC-171 or GC-173. **Without filling tubes.** Each **£1. 0. 0.** *a*

GC-171
FILLING TUBES, thin wall glass in a pack sufficient to fill one absorption vessel GC-170. Pack **£0. 5. 0.** *a*

GC-173
FILLING TUBES, thin wall glass with internal copper wire spiral for use with cuprous chloride absorbent. Pack sufficient to fill one absorption vessel GC-170. Pack **£1. 1. 0.** *a*

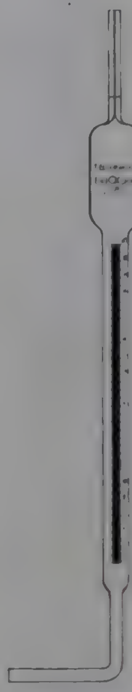
GC-176
ABSORPTION VESSEL, (AG), **Shepherd bubbling type,** with fritted glass distributor, ref. No. 88X1, for rapid and efficient absorption ... Each **£3. 16. 0.** *a*

Note: This vessel may be used as an alternative for absorption of CO_2 or O_2, except in GC-020.

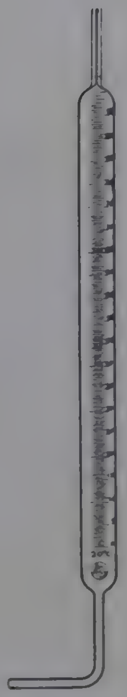
GC-178
GAS PIPETTE, Harden slow combustion, as fitted to GC-120, comprising stout vessel with rubber stopper holding both the platinum wire element with its leads, and glass tube for levelling bulb connection. Each **£1. 19. 0.** *a*

GC-180
STOPCOCK MANIFOLD, (AG), for GC-100, with two side stopcocks and one T-bore end stopcock. Each **£3. 18. 0.** *a*

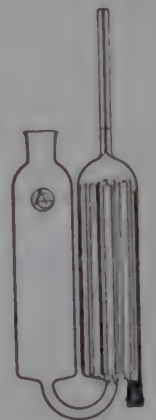
GC-182
STOPCOCK MANIFOLD, (AG), as GC-180 but for GC-110, with three side stopcocks. Each **£4. 4. 0.** *a*



GC-150



GC-154



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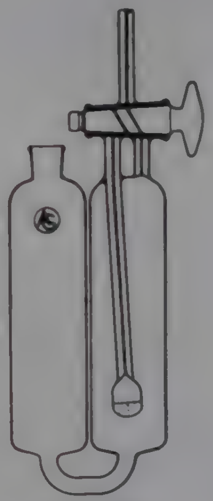

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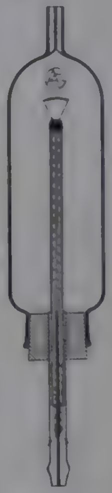

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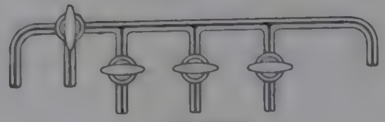


GC-182

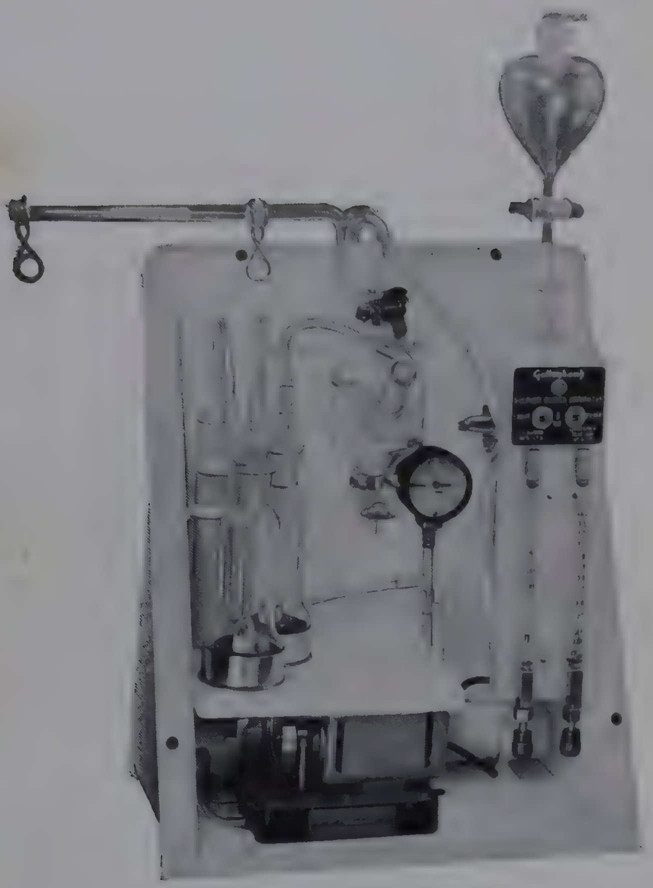
GC-184
STOPCOCK MANIFOLD, (AG), as GC-180 but for GC-120, with five side stopcocks ... Each **£5. 18. 0.** *a*

AU-340	**Levelling bottle,** 250 ml ...	For details and prices see entries in List No. sequence.
MF-920	**Mercury reservoir,** 125 ml for GC-120	
MF-932	**Mercury,** triple distilled ...	
RV-030	**Rubber bellows**	

All items on this page normally available from stock.

Gallenkamp — C.E.R.L. SULPHUR OXIDES ANALYSER

TO BS 1756 Part 4



GC-220

This apparatus has been developed in collaboration with the Central Electricity Research Laboratories, Leatherhead, Surrey, for the rapid determination of the concentration of sulphur dioxide and sulphur trioxide in flue gases. It is contained in a fibreglass carrying case for easy transport, stowage being provided for the projecting glass parts. An illuminated panel behind the flowmeters facilitates adjustment of the flow rates under the most difficult conditions. The flowmeters are protected from accidental damage by a transparent screen.

References

Fielder, Jackson and Raask, J. Inst. Fuel, 1960, 33, No. 229, 85.
Fielder and Morgan, Anal. Chim. Acta, 1960, 23, 538.

METHOD

Flue gas is sampled through a stainless steel probe heated to about 250°C by electric heating tapes. Dust particles are removed and the gas passes through a bubbler where it meets an aqueous isopropanol stream, the flow rate of which is controlled by a needle valve and indicated by a flowmeter. The combined flow then passes into a fritted glass absorber where the sulphur trioxide is absorbed. The isopropanel is collected below the fritted plate and is drawn off for titration at the end of the sampling period. The residual gas passes into a wash bottle containing iodine solution, the rate of discoloration of which is indicative of the sulphur dioxide concentration. A diaphragm pump is used to aspirate sample gas through the apparatus. Its speed is controlled by a built-in rheostat and the gas flow is adjusted by a needle valve and indicated on a flowmeter calibrated from 0·5 to 1·3 litres/min. A second wash bottle containing water and an absorber tube containing *Soxazorb* prevent attack of the diaphragm pump. A vacuum gauge is fitted to the aspiration pump.

GC-220

C.E.R.L. SULPHUR OXIDES ANALYSER, *Gallenkamp*, as specification, with all glass parts, in fibreglass case, with 5 ft stainless steel probe and one charge of *Soxazorb*, for 220/240V a.c. single phase supplies. **Without heating tape, reagents or titration equipment** ... ... Each **£108. 5. 0.** *a*

Also available for 110/120 or 200/210V a.c. supplies to order.

When ordering please state voltage and nature of supply.

ACCESSORIES

HE-150	**Heating tape,** 48 in long, ½ in wide. Approximate loading 72W. Supplied with lead-in wire and connector; **three required for 5 ft probe.** For price see entry in List No. sequence.
BT-215	**Bottle, polypropylene,** wide mouth, capacity 125 ml, suitable for receiving isopropanol from absorber for titration. For details and price see entry in List No. sequence.
AR-505	**Asbestos tape,** 25 × 1·5 mm. For details and price see entry in List No. sequence.

REPLACEMENT PARTS

GC-226	**'Soxazorb',** to absorb sulphur dioxide. Made to C.E.R.L. specification	Per kg	**£5. 14. 0.**	*m*
GC-228	**Sampling probe,** stainless steel. 5 ft long, with 18/9 cup joint	Each	**£4. 12. 0.**	*a*
GC-230	**Filter tube,** packed with quartz wool, with 18/9 ball joints	Each	**£1. 9. 0.**	*a*
GR-160	**Quartz wool.** For price see entry in List No. sequence.			
GC-232	**Isopropanol reservoir,** with stopcock and 24/20 socket.	Each	**£1. 9. 0.**	*a*
GC-234	**Mariotte tube,** with 24/20 cone for reservoir GC-232.	Each	**£0. 9. 3.**	*a*
GC-236	**Isopropanol bubbler,** with 18/9 cup and ball joints.	Each	**£2. 5. 0.**	*a*
GR-100	**Glass balls,** 3 mm dia. For details and prices see entry in List No. sequence.			
GC-238	**Absorber,** with fritted glass plate porosity 4, 18/9 cup, 14/23 socket and stopcock	Each	**£4. 12. 0.**	*a*
GC-240	**Connector,** right angled, 14/23 cone.	Each	**£0. 6. 3.**	*a*
GC-242	**Washbottle head,** with distribution tube porosity 0 and 24/29 cone	Each	**£1. 9. 0.**	*a*
GC-243	**Bottle,** for GC-242, capacity 125 ml, 24/29 socket.	Each	**£0. 15. 6.**	*a*
GC-244	**Absorption column,** *Soxazorb*, with 24/29 socket, unfilled	Each	**£0. 12. 6.**	*a*
GC-246	**Connector,** 24/29 cone	Each	**£0. 8. 0.**	*a*
GC-248	**Flowmeter, isopropanol,** calibrated metering tube and float only	Each	**£5. 14. 0.**	*a*
GC-254	**Flowmeter, flue gas,** calibrated metering tube and float only	Each	**£5. 14. 0.**	*a*
GC-256	**Tubing, silicone rubber** ,translucent, 5 mm bore, 2 mm wall	Per yd.	**£0. 12. 3.**	c
TJ-380	**Thermometer,** water jacket, scale span 10 to 40°C. For details and price see entry in List No. sequence.			
GC-258	**Joint clip,** for heated joints 18/9 ...	Each	**£0. 6. 0.**	*b*
JR-260	**Joint clip,** JC 19/18, for absorber. For details and price see entry in List No. sequence.			

All items on this page normally available from stock.

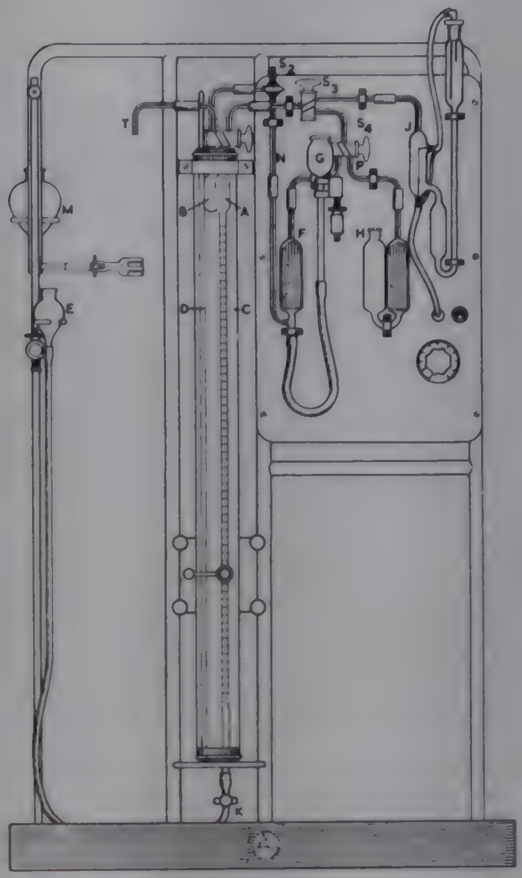
Gallenkamp HALDANE GAS ANALYSER

GC-300

GAS ANALYSER, Haldane, *Gallenkamp*, laboratory model, to BS 1756 Part 3, for the determination of O_2, CO_2, CO, H_2, and CH_4. All glass parts are retained by metal clips on a white plastics panel mounted on a tubular steel framework which is supported by a mercury tray. A control rheostat and mains transformer are also mounted on the panel. The burette jacket is fitted with a movable illuminated screen and reader. Screw operated adjustment to 0·05 mm is provided for the reservoirs which control the levels in the burette and potash pipette. Requires approx. 1·3 kg mercury excluding sampling tube assembly. For 200/250V 50 Hz supplies. **Without mercury or reagents** ... ... Each **£116. 17. 6.** *b*

Analysers with transformers for 110/130V a.c. mains can be supplied to order.

In the U.K. this apparatus is supplied packed in a metal frame charged at £5 which is refunded on return in good condition.



GC-300

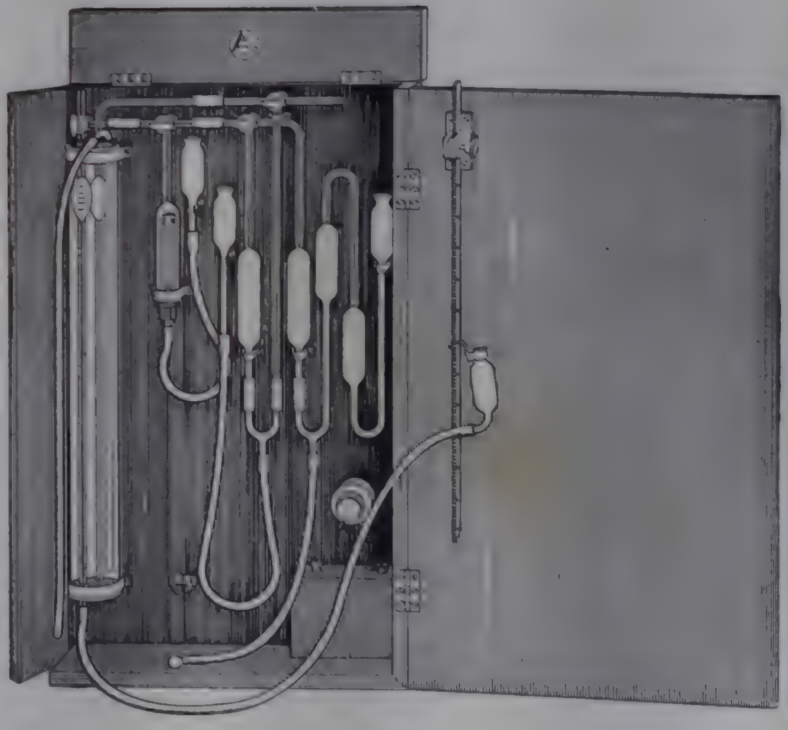
ACCESSORIES

GC-302	**Sampling and analysis of flue gases—BS 1756 Part 3.** This standard describes the use of the Haldane analyser.	Each **£0. 10. 0.**	*f*
MF-932	**Mercury, triple distilled,** suitable for gas analysis apparatus. For price see entry in List No. sequence.		

REPLACEMENT PARTS

GC-310	**Burette (A),** *Technico*, Class A, graduated 15 to 21 cm^3 in 0·01 cm^3 with 2·5 cm^3 mark on the bulb.	Each **£13. 5. 0.**	*a*
GC-312	**Compensating bulb (B),** capacity 20 ml.	Each **£1. 1. 0.**	*a*
GC-314	**Water jacket (C),** for burette GC-310.	Each **£2. 12. 0.**	*a*
GC-315	**Mercury reservoir (E),** 100 ml ...	Each **£0. 7. 6.**	*a*
GC-316	**Absorption vessel (F),** for absorbing CO_2 in KOH, packed with glass tubes	Each **£2. 4. 0.**	*a*
GC-318	**Absorption vessel (H),** for absorbing O_2 in pyrogallol, packed with glass tubes	Each **£2. 12. 0.**	*a*
GC-321	**Combustion pipette (J),** with Pt element for combustion of H_2 and CH_4	Each **£4. 14. 0.**	*a*
MF-920	**Mercury reservoir (M),** for sample introduction 250 ml. For price see entry in List No. sequence.		
GC-322	**Potash reservoir (G)**	Each **£0. 13. 0.**	*a*
GC-325	**Connecting piece (N)** with stopcock (S2).	Each **£2. 4. 0.**	*a*
GC-326	**Connecting piece (P),** between burette, absorption vessels and combination pipette, with two oblique bore stopcocks (S3 and S4)	Each **£2. 16. 0.**	*a*

For suitable Gas Sampling Tubes see GF-405 in List No. sequence.



GC-350

GC-350

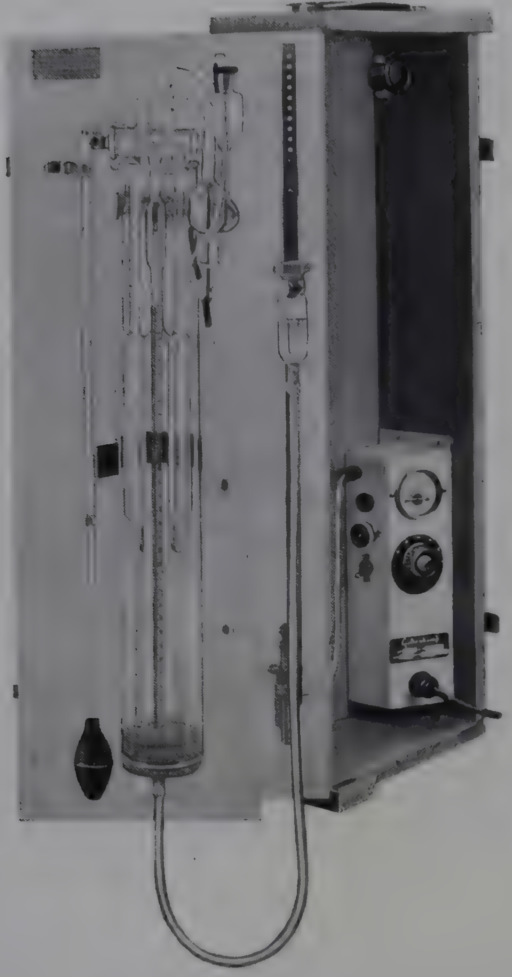
GAS ANALYSER, Haldane, *Gallenkamp*, a portable modified version of GC-300. Comprising 10 cm^3 burette with 3 cm^3 in graduated portion, and compensating vessel in water jacket, with combustion vessel, two absorption vessels, three mercury reservoirs and a guard tube. Requires approx. 1 kg mercury. With rheostat and filling tubes, in portable polished wood case, dimensions 56 × 38 × 9 cm. **Without mercury, reagents or battery** ... ... Each **£35. 0. 0.** *b*

Suitable battery, *Ever Ready* No. 126 or *Siemens* No. B6.

All items on this page normally available from stock.

Gallenkamp LLOYD GAS ANALYSER

(Patented)



GC-412

- **For determination of O_2, CO_2, CO, CH_4, H_2 and other gases such as C_2H_2 and N_2O**
- **Rapid - complete O_2/CO_2 analysis in 6 minutes**
- **Suitable for BS 1756 'Sampling and analysis of flue gases'**
- **Accurate to 0·02% total volume**
- **Single stopcock operation**
- **Leak-free construction**
- **Temperature and pressure compensated**
- **Fully portable—easily cleaned and recharged**
- **Simple levelling**

APPLICATIONS

Research and applied physiology · Respiratory gas analysis · Mine air analysis · Flue gas analysis · Fuel gas analysis · Teaching of laws of chemical combination · Analysis of standard gas mixtures for calibration of automatic analysers · Calibration of blood gas electrodes.

REFERENCES

(1) Haldane, J. S. and Graham, J. I. (1935). 'Methods of air analysis' 4th ed. London: Griffin.
(2) Lloyd, B. B. (1958). 'Development of Haldane's Gas Analysis Apparatus.' J. Physiol., 143, 5-6 p.
(3) Lloyd, B. B. (1960). British Patent Specification No. 844905 'Gas Analysis Apparatus.'
(4) Hill, D. W. (1963). 'Bull. Inst. Phys.', 14, 2.
(5) Durnin and Passmore. 'Energy, Work and Leisure', pp. 19-20. 1967. Pub. Heinemann, London.

DESCRIPTION

The main glass part is of borosilicate glass, adequately bridged for strength and rigidity, and it is enclosed in a water jacket stirred by bubbling air from a blow ball. At the top of the 10·1 cm³ burette, calibrated from 7 cm³ in 0·01 cm³ is the five-way stopcock, the key of which has four separate bores.

Rotation of the key connects the burette in turn to:

1. the sample inlet tube,
2. the CO_2 absorption pipette,
3. the O_2 absorption pipette,
4. the residual gas outlet tube or accessories such as combustion or absorption pipettes. In any intermediate position the burette is closed.

Each absorption pipette has a ring index on the capillary connecting it to the stopcock and each has a reservoir at the rear, the two reservoirs having a common cone vent cap. The cap is removable for the washing out and recharging of the reservoirs with reagents. During analyses the cap encloses a fixed mass of air which assumes constant volume behind the reagents when they are brought to their respective index marks by adjustment of the height of the mercury reservoir. This feature together with the enclosure of all glass parts within the water jacket eliminates the effects of temperature and of atmospheric pressure changes on the gas volume in the burette.

Levelling to constant volume is first done approximately by hooking the mercury reservoir in a perforated metal strip and then accurately by adjusting the height of the strip by means of a knurled nut. The use of ring and half-ring burette graduations and the provision of a magnifier reader, permit the readings of gas volumes to within 0·001 cm³. This provides an analytical accuracy of 0·02% total gas volume.

The analyser is contained in a case (with carrying handle) which acts as a stand in use. Also supplied are a sample transfer tube, a small tubular reservoir for the outlet, a magnifier-reader and a polythene cannula for the addition and removal of reagents.

NOTE: The Lloyd Gas Analyser directly measures sample components up to 30% of total gas volume. For higher concentrations, gas samples may easily be diluted with inert gas *prepared from air.*

The Lloyd Gas Analyser is at least as accurate as traditional absorption apparatus and incorporates the following improvements:

Single stopcock. A complete CO_2, O_2 determination may be carried out with four movements of a single large-surface stopcock. This stopcock also permits rapid washing-in of successive samples for analysis without spillage of mercury.

Leakage. The whole main working assembly is composed of a single blown glass structure without joints; leakage is therefore impossible.

Temperature and pressure compensation. The main glass part is totally immersed in a single water-jacket to keep it at a uniform temperature. A fixed mass of air is enclosed above the reagents in the reservoirs, and all readings are made with this mass of gas at constant volume. Corrections for sudden or long-term changes in temperature are, therefore, not required.

Portable design. Even when charged with reagents, the analyser is convenient and safe to carry or transport.

Compact design. As a result of the proximity of the reservoirs to the burette, dead space is reduced to a minimum and absorption is rapid and efficient.

Cleaning. In the event of a manipulative error, washing out of displaced reagents and, if necessary, cleaning and refilling are simple and rapid.

Levelling. This was a major drawback of the Haldane gas analysis apparatus, which involved *simultaneous* manipulation of two reservoirs, and the *simultaneous* observation of *two* meniscuses. In the Lloyd apparatus *only one* reservoir has to be moved and *only one* meniscus watched.

Gallenkamp LLOYD GAS ANALYSER

(Patented)

(continued)

ACCESSORIES

The Lloyd Gas Analyser is supplied either with or without accessories, depending upon whether or not combustible or other gases are to be analysed in addition to oxygen and carbon dioxide.

The single and double absorption pipettes (GC-442 and GC-444) are for analyses in which absorbents in addition to KOH and pyrogallol are required for component gases such as carbon monoxide and unsaturated hydrocarbons. These absorption pipettes are of similar design to those of the main glass part and are of one-piece borosilicate glass construction. They are attached to the interchangeable joint on the outlet tube above the stopcock.

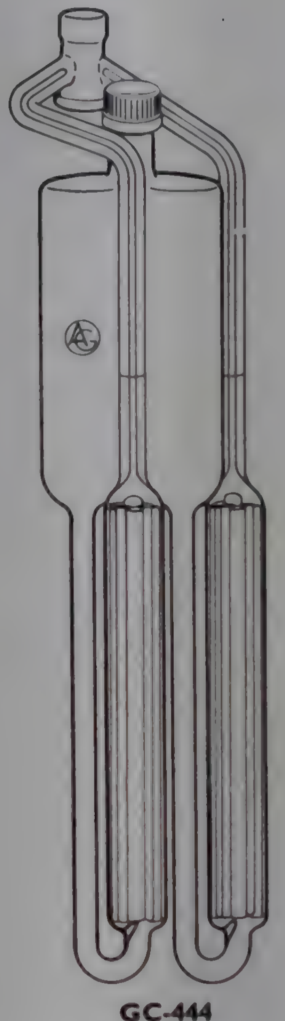
The combustion pipette (GC-452) is for analyses of gas mixtures containing combustible components such as CO, H_2 and CH_4. It is of one-piece borosilicate glass construction and attaches to the interchangeable joint on the outlet tube above the stopcock. The pipette has two ground sockets into which are fitted a mercury switch contact and a platinum filament assembly.

Rapid combustion is effected by the carefully constructed and positioned detachable platinum filament which is electrically heated. A step-down mains transformer is built-in to the control box but, in the absence of a mains supply an external battery may be used. In this case a battery of 4·5V to deliver 2A is required. Filament temperature is controlled by a built-in ammeter and rheostat, so that low and high temperature combustion components may be determined separately.

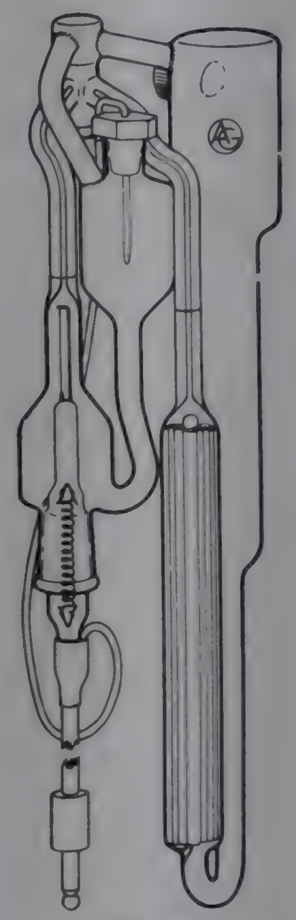
The combined combustion/absorption pipette (GC-454) is for analyses where some gases other than O_2 and CO_2 are to be determined by absorption and others by combustion. It is particularly applicable to estimation of unsaturated hydrocarbons in fuel gas analysis. It virtually comprises a single absorption pipette as GC-442 and combustion pipette GC-452 all combined into a single glass component which is attachable to the main apparatus in the same way as described above.

Detailed operating procedure is carefully explained in the instruction manual supplied with each analyser.

Gallenkamp hold the exclusive licence to manufacture and sell, as well as use the name Lloyd in connection with the Lloyd Gas Analyser. The apparatus is covered by the following patents: Great Britain 844,905, U.S.A. 2972523, Germany 1105639, Canada 629500, Japan 283681.



GC-444



GC-454

GC-400
GAS ANALYSER, Lloyd, *Gallenkamp*, as specification for O_2 and CO_2 determinations. Complete in carrying case, but **without mercury or reagents.** Requires approximately 350 g mercury. Overall dimensions 70 × 25 × 16 cm (27½ × 10 × 6 in.), weight 7 kg (16 lb). Each **£54. 5. 0.** *b*

GC-402
GAS ANALYSER, Lloyd, *Gallenkamp*, as GC-400 but including supplementary **single** absorption pipette (GC-442) for a third absorbent ... Each **£66. 10. 0.** *b*

GC-404
GAS ANALYSER, Lloyd, *Gallenkamp*, as GC-400 but including supplementary **double** absorption pipette (GC-444) for additional absorbents. Each **£70. 10. 0.** *b*

GC-412
GAS ANALYSER, Lloyd, *Gallenkamp*, as GC-400 but including combustion pipette (GC-452), for O_2, CO_2, CO, H_2 and CH_4 determinations. Complete in carrying case with electrical controls, but **without mercury or reagents.** Requires approximately 500 g mercury. Each **£82. 10. 0.** *b*

GC-414
GAS ANALYSER, Lloyd, *Gallenkamp*, as GC-412 but with combined combustion/absorption pipette (GC-454) in place of combustion pipette. Each **£103. 15. 0.** *b*

REPLACEMENT PARTS

GC-430	**Burette assembly,** consisting of borosilicate glass burette with 5-way stopcock and absorption vessels in one unit, assembled complete with rubber stopper in water jacket	Each **£33. 10. 0.**	*a*
GC-442	**Absorption pipette, single,** with ground socket.	Each **£11. 7. 6.**	*a*
GC-444	**Absorption pipette, double,** with ground socket.	Each **£15. 15. 0.**	*a*
GC-452	**Combustion pipette,** with ground socket and filament assembly GC-460	Each **£9. 10. 0.**	*a*
GC-454	**Combustion/absorption pipette,** combined in a one-piece glass component, complete with ground socket and filament assembly GC-460 ...	Each **£31. 10. 0.**	*a*
GC-460	**Filament assembly** with ground cone mounting, for GC-452 or GC-454 (also GC-412 and GC-414).	Each **£3. 12. 0.**	*a*
MA-660	**Magnifier.** For price see entry in List No. sequence.		

ACCESSORIES

LX-220	**Lubricant**	alternative lubricants for 5-way stopcock.	For prices see entries in List No. sequence.
VB-882	**Apiezon grease**		
MF-932	**Mercury,** triple distilled		
SY-410	**Syringe,** all glass, 20 ml, for introducing reagents into analyser		

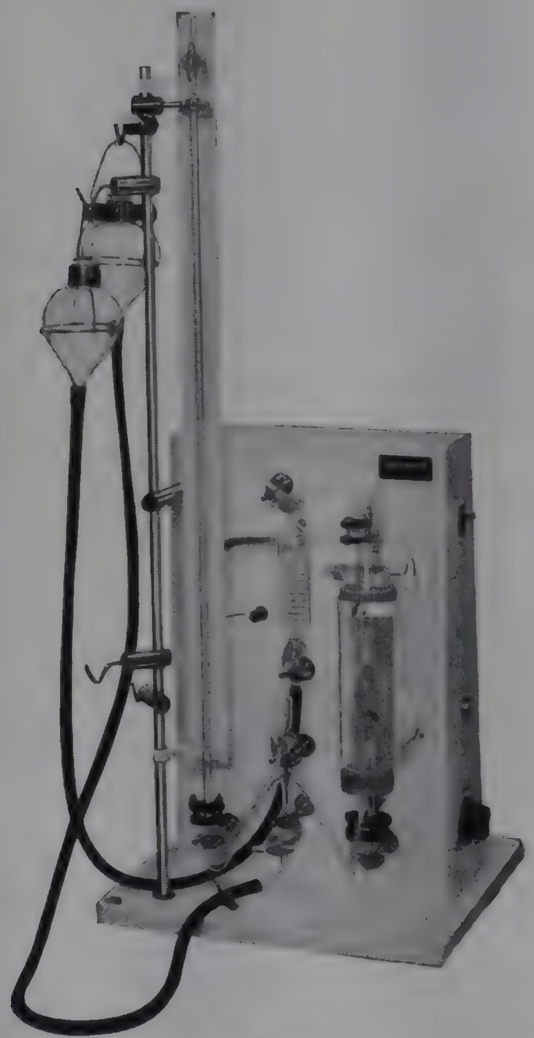
All items on this page normally available from stock.

Gallenkamp MANOMETRIC GAS ANALYSER

(Van Slyke pattern, modified by J. H. High)

For the accurate determination of gases by absorption and combustion methods.

- **Efficient, quiet operation**
- **Interchangeable standard glassware**
- **Magnetic agitation**



GC-500

The standard Van Slyke Manometric Analyser was originally designed for the determination of gases dissolved in liquids. It is described under List No. MC-500 and detailed methods of use for clinical applications are published in 'Quantitative Clinical Chemistry' Vol. 2 by Peters and Van Slyke. The analysers described below incorporate the subsidiary gas reservoir due to J. H. High of the Hawker Siddeley Nuclear Power Co. With this modified analyser the principles are unaltered although the operating detail depends upon the particular application.

The analyser is particularly suitable for multiple determinations using only one sample. It can be calibrated with gas mixtures thus making standardisation of reagents unnecessary. The method of measurement obviates the normal complicated pressure correction procedure. At the same time, the combustion technique is simplified considerably.

GENERAL DESCRIPTION

GAS RESERVOIR

The borosilicate glass reservoir is graduated 0 to 50 cm^3 in 5 cm^3 and is connected to the reaction pipette by an interchangeable spherical joint. A stopcock at the base leads to a second mercury reservoir and a double bore stopcock at the top leads to the atmosphere and to the reaction pipette. A 10/19 side socket is closed by either a glass stopper or a plug carrying the platinum heating assembly.

DETERMINATION OF GASES BY ABSORPTION

The modified analyser without the platinum filament is used to determine gases by absorption: CO_2 in KOH solution and oxygen in pyrogallol. Operating technique is similar to that with the standard analyser but the gas volume after absorption is found without resorting to complicated correction procedure thus improving accuracy and saving time. Gas remaining in the reaction pipette after absorption is transferred to the gas reservoir, the reagent solution is expelled, the gas readmitted to the pipette and the true pressure noted. Other components may be determined successively from the same sample, using a combustion method when necessary.

DETERMINATION OF GASES BY COMBUSTION

Replacing the plain stopper of the gas reservoir by the platinum filament assembly enables the analyser to be used for determining gases: H_2, CO, CH_4, etc., by combustion. The pressure of oxygen admitted to the reaction pipette and of the oxygen/gas mixture are noted, the gaseous mixture transferred to the gas reservoir where combustion takes place, the resultant mixture readmitted to the reaction pipette and the final pressure noted.

GC-500

MANOMETRIC GAS ANALYSER, Van Slyke pattern, *Gallenkamp*, **modified by J. H. High,** as specification, for accurate determination of gases by absorption methods. Requires approx. 3·5 kg mercury. For 200/250V 50 Hz single phase supplies.
Each **£97. 0. 0.** *b*

GC-505

MANOMETRIC GAS ANALYSER, Van Slyke pattern, *Gallenkamp*, **modified by J. H. High,** as specification, for accurate determination of gases by combustion methods. With transformer and rheostat for heating platinum filament. Requires approx. 3·5 kg mercury. For 200/250V 50 Hz single phase supplies.
Each **£112. 0. 0.** *b*

REPLACEMENT PARTS

GC-510	**Reaction pipette,** High, with spherical joint.	Each **£7. 0. 0.**	*a*
GC-512	**Gas reservoir,** High, with stopcocks and 10/19 stopper.	Each **£5. 16. 0.**	*a*
GC-515	**Platinum filament assembly,** 10/19 cone with lead and plug	Each **£1. 16. 0.**	*a*

For other replacement parts and accessories see MC-510 et seq. in List No. sequence.

All items on this page normally available from stock.

Technico
REGD. TRADE MARK

GAS BURETTES

GD-010

GAS BURETTE, Hempel, *Technico*, without stopcocks. Capacity 100 cm³ graduated in 0·2 cm³, with levelling tube but **without rubber tubing.** Pair **£1. 19. 0.** *a*

GD-020

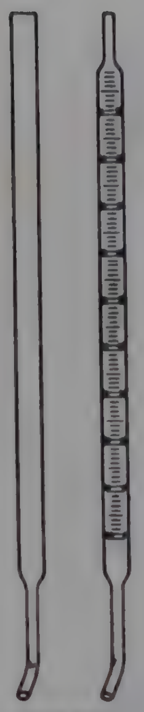
GAS BURETTE, Hempel, *Technico*, as GD-010 but with straight bore stopcock at top and two-way stopcock at bottom ... ... Pair **£4. 6. 0.** *a*

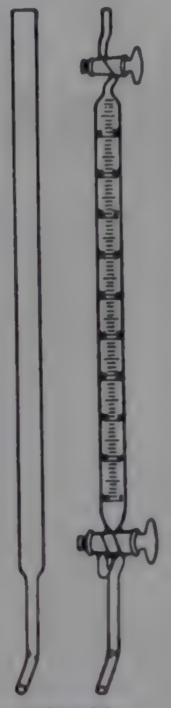
GD-050

GAS BURETTE, Tutweiler, *Technico*, for the determination of H_2S in gas samples. Upper cylinder graduated 0–10 cm³ in 0·1 cm³ and with two marks on main bulb at 100 and 110 cm³ ... ... Each **£3. 4. 0.** *a*

CC-680

GAS BURETTE, Martin's. For details see entry in List No. sequence.


GD-010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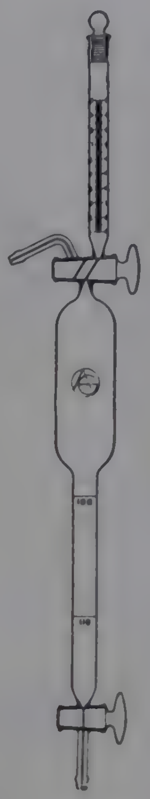

GD-050

GAS COLLECTING

GD-240

BEEHIVE SHELVES, earthenware.

Diameter	7·5	10 cm	
Dozen	30/–	44/–	c
Each	4/–	5/–	

GD-245

PNEUMATIC TROUGHS, stout borosilicate glass, circular, for collection of gases over water or for storage of specimens.

Diameter	15	20	25	30	35 cm	
Height	10	10	12	12	15 cm	
Dozen	150/–	189/9	317/–	404/–	660/–	d
Each	13/9	17/5	29/–	37/–	60/6	

GD-250

GAS JARS, stout glass, with ground flange.

Height	15	20	25	30 cm	
Int. dia.	5	5	5	7·5 cm	
Dozen	78/–	90/–	106/–	190/–	c
Each	7/8	8/6	9/9	17/6	

GD-265

COVERS, glass, flat and ground on one side, for GD-250.

Diameter of cover	7·5	10·5 cm	
Diameter of gas jar	5	7·5 cm	
Gross	70/–	140/–	c
Dozen	7/–	12/9	

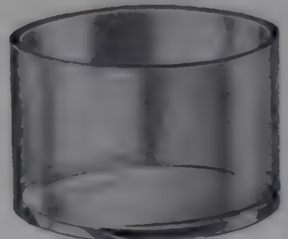
GD-300

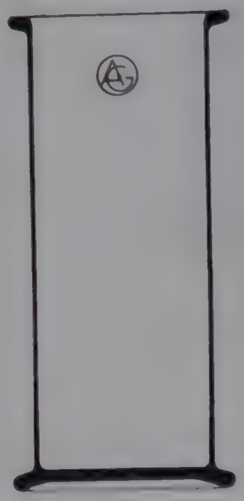
DEFLAGRATING SPOON, for burning sulphur, with brass shield. Dozen **£1. 2. 0.** Each **£0. 3. 5.** c

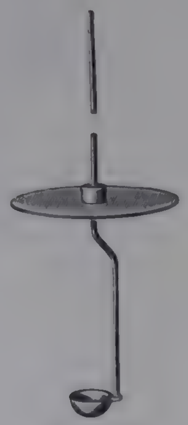
GD-320

SPLINTS, wood, for igniting and testing gases, in bundles of 1000. Dozen bundles **£2. 14. 0.** Bundle **£0. 5. 10.** *m*

GD-240


GD-245


GD-250


GD-300

All items on this page normally available from stock.

GAS CYLINDERS AND ACCESSORIES

GD-420

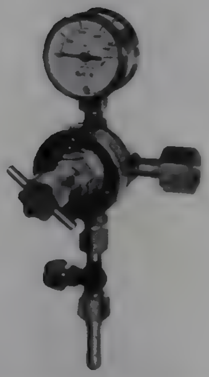
GAS CYLINDERS, steel, colour coded to BS 349 according to gas content, 12·5 cm dia., **filled with gas (not suitable for inhaling).**

List No.	Contents	Each	
GD-401	28 lb carbon dioxide	**£20. 10. 0.**	*mN*
GD-402	40 ft³ air	**£16. 10. 0.**	*mN*
GD-403	40 ft³ nitrogen	**£16. 10. 0.**	*mN*
GD-404	40 ft³ hydrogen	**£16. 10. 0.**	*mN*
GD-405	48 ft³ oxygen	**£16. 10. 0.**	*mN*

Quotation on application for gases not listed above.

GD-420
COMBINATION TOOL, made of malleable iron, comprising a combined coupling wrench for flynut union nuts, spanner for cylinder gland nuts and key to fit cylinder valves ... ... Each **£0. 13. 9.** *m*

GD-500
GD-501


GD-510 with GD-536

FINE ADJUSTMENT VALVES

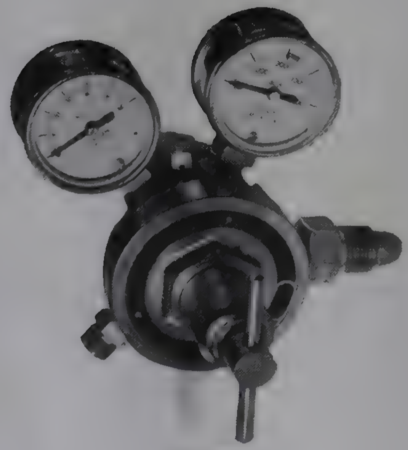
GD-500
FINE ADJUSTMENT VALVE for oxygen, air, nitrogen and argon, right hand thread, coloured black, with standard bull nosed inlet to BS 341. Brass and gunmetal construction, with knurled control knob and tapered nozzle for flexible tubing connection.
Each **£3. 0. 0.** *m*

GD-501
FINE ADJUSTMENT VALVE for hydrogen and coal gas, as GD-500 but **left hand thread,** coloured red.
Each **£3. 0. 0.** *m*

PRESSURE REGULATORS

GD-510
PRESSURE REGULATOR for carbon dioxide only, with $2\frac{3}{16}$ in (55 mm) diaphragm. This regulator connects direct to a carbon dioxide cylinder and has a cylinder contents gauge reading to 2300 lb/in². The outlet pressure is adjustable from 0 to 120 lb/in² and is indicated by the position of the adjusting screw. With safety valve fitted in low pressure side and outlet nozzle for 6 mm bore flexible tubing connected by a $\frac{3}{8}$ in BSP union.
Each **£7. 10. 0.** *m*

GD-530
PRESSURE REGULATOR for oxygen, air, nitrogen and argon, right hand thread. Two stage diaphragm type giving low outlet pressures for general purpose welding etc. With contents gauge calibrated 0 to 3000 lb/in² and outlet pressure gauge calibrated 0 to 30 lb/in² in 1 lb/in² divisions. With outlet nozzle for 6 mm bore flexible tubing connected by a $\frac{3}{8}$ in BSP union. With **right hand threads** ... ... Each **£10. 15. 6.** *m*


GD-530
GD-531

GD-531
PRESSURE REGULATOR for hydrogen, propane and coal gas, as GD-530 but with **left hand threads.**
Each **£11. 0. 0.** *m*

ACCESSORIES

GD-536 **Needle valve,** right hand thread, for fine adjustment of gas flow, to be inserted between regulator and outlet nozzle. For use with GD-510 or GD-530.
Each **£1. 11. 0.** *m*

GD-538 **Needle valve,** as GD-536 but with left hand thread. For use with GD-531 ... ... Each **£1. 15. 0.** *m*

Items on this page normally available from stock except those coded *N.*

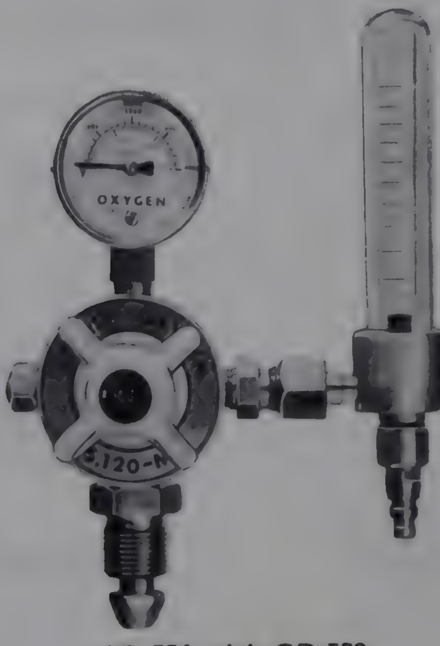
FLOW REGULATORS

GD-556

FLOW REGULATOR for oxygen (suitable also for air, nitrogen and argon). For the accurate control of flow rates up to 10 litre/min. Particularly convenient for low flow rates frequently required in the laboratory. The regulator comprises a single stage diaphragm valve with a knob which provides smooth control of flow rate. The body of the regulator is well finished in silver grey enamel and intended for medical purposes and general laboratory applications. The standard bull nosed inlet is to BS 341 with right hand thread. The regulator includes a cylinder contents gauge and a tapered adapter for rubber tubing.
Each **£10. 0. 0.** *m*

GD-558

FLOWMETER, for use with GD-556 in place of the rubber tubing adapter which is then screwed to the flowmeter outlet. Calibrated 1 to 10 litre/min oxygen (with other gases the flowmeter readings must be corrected) ... ... Each **£4. 8. 0.** *m*



GD-556 with GD-558

IMPORTANT NOTES

1. Pressure regulators are designed to give reasonably steady outlet pressure over a range of flow rates; flow regulators are designed to give reasonably constant flow against fluctuations in back pressure.
2. It is not good practice to include needle valves downstream of components (e.g. flowmeters and low pressure gauges) not intended for high pressure operation unless a safety valve is fitted. Otherwise, with the needle valve screwed shut, leakage past the high pressure valve could slowly cause a sufficient build up of pressure to cause the low pressure component to explode.

GD-560

GD-562

PROPANE AND BUTANE REGULATORS

PRESET REGULATORS

GD-560

PRESSURE REGULATOR for propane, outlet pressure preset to 14 in w.g. with bull nosed inlet with left hand thread to BS 341 and rubber tubing nozzle.
Each **£2. 7. 0.** c

GD-562

PRESSURE REGULATOR for butane, outlet pressure preset to 11 in w.g. with flat flanged inlet with left hand thread and rubber tubing nozzle ... Each **£1.17. 0.** c

GD-568

ADJUSTABLE REGULATORS

GD-531

REGULATOR with bull nose inlet and left-hand thread is suitable for use on propane cylinders. It can also be used on butane cylinders by fitting a conversion adapter GD-568. For price see entry in List No. sequence.

GD-568

ADAPTER, for fitting regulator GD-531 to butane cylinders having left-hand flat flanged connection.
Each **£0. 6. 0.** c

All items on this page normally available from stock.

CYLINDER TROLLEYS AND STANDS

GD-602

GD-620
GD-625

CYLINDER TROLLEYS, for moving oxygen and other gas cylinders with a minimum of handling. Strongly constructed in heavy gauge steel tubing with welded joints, each trolley has cylinder retaining attachments and 6 in diameter rubber tyred wheels.

GD-602

CYLINDER TROLLEYS, as specification, laboratory quality finish in stoved enamel with anti-static wheels.

Size No.	2	3	4	5	
For cylinders max. dia.	5¾	7	8	9 in	
Each	**265/–**	**340/–**	**380/–**	**410/–**	*c*

The following table shows the capacities and diameters of commonly used gas cylinders, together with suitable trolley size.

Dia. in	Capacity				Trolley size No.
	O_2	N_2O	CO_2	H_2, N_2 & Air	
5	—	—	14 lb	—	2
5½	48 ft^3	800 gal	28 lb	40 ft^3	2
7	120 ft^3	2000 gal	—	110 ft^3	3
8	180 ft^3	—	40 lb	165 ft^3	4
9	240 ft^3	—	—	—	5

GD-620

CYLINDER STAND, strongly constructed in steel, nylon coated to take cylinders up to 5¾ in dia.
Each **£5. 8. 0.** *m*

GD-625

CYLINDER STAND, as GD-620 but to take cylinders up to 7 in dia. ... ... Each **£5.10. 0.** *m*

Gallenkamp THERMISTOR KATHAROMETER

REGD TRADE MARK

Suitable for

- **Gas concentration control**
- **Pilot-plant applications**
- **Purpose-built gas chromatographs**

KATHAROMETER
Gallenkamp
MADE IN ENGLAND

GD-700

By monitoring the difference between the thermal conductivities of the sample stream and a reference stream, the katharometer forms a very sensitive detector for impurities or emerging components.

GD-700

KATHAROMETER, Thermistor, *Gallenkamp*, in diecast case with rubber feet and two inlet and two outlet tubulures for 6·3 mm o.d. copper or nylon connecting tubes. Four terminal leads are labelled to show the thermistor connections to any Wheatstone bridge circuit with arm resistance values about 250 ohms. A recorder or high resistance spot galvanometer, sensitivity 5 to 10 mV impedance over 1 kΩ is required to indicate the output.

Technical data:

Bridge current	ca. 8 mA
Gas flow	20–100 ml/min
Sample volume	liquids 10 μl gases 0·5–1 ml
Detection limit	10^{-7} g

Requires but does not include a 4·5V battery or other d.c. supply, recorder, galvanometer or Wheatstone bridge ... ... Each **£28. 0. 0.** *b*

All items on this page normally available from stock.

FRITTED GLASS GAS DISTRIBUTORS

Regd.

GD-820

GAS DISTRIBUTION TUBES, (AG), borosilicate glass, **with domed fritted glass plate** and 30 cm length stem. This robust pattern gives better absorption than a tube with a flat plate since the bubbles spread out in all directions thus utilising all the absorption space. The domed plate, which has an equivalent diameter of 20 mm, permits insertion of the tube through a 19/26 socket. Ref. Nos. 28X0, 28X1 and 28X2.

Dozen **£5. 2. 0.** Each **£0. 9. 6.** *a*

ACCESSORIES

TJ-325 **Adapter,** with 19/26 cone, for fitting tubes GD-820 into apparatus with 19/26 sockets. See entry in List No. sequence.

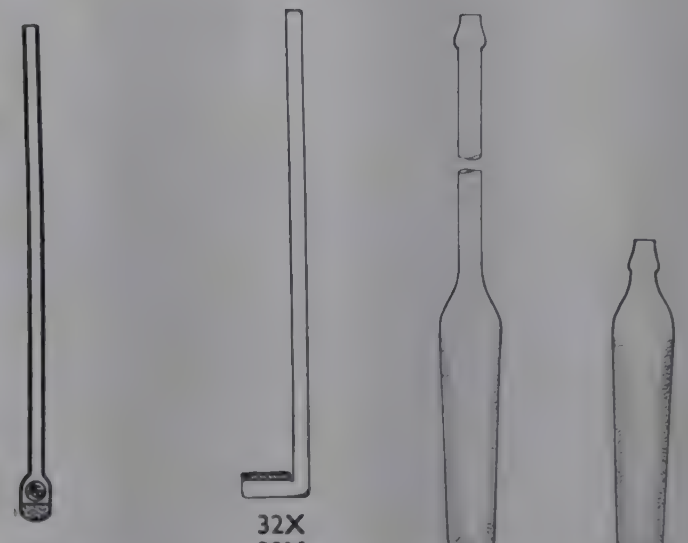
Note: A short length of rubber or plastics tubing of 6 mm bore is required to effect a seal between the tube and the adapter.

GD-830

GAS DISTRIBUTION TUBES, (AG), borosilicate glass, **with flat fritted glass plate** and 15 cm length stem. The approximate minimum gas pressure necessary to force gas through wet places of the various porosities is shown in mm mercury.

	Plate dia., mm 15	20	Pressure	
Ref. Nos.	32X0	33X0	8	
	32X1	33X1	15	
	32X2	33X2	25	
	—	33X3	55	
	—	33X4	180	
Dozen	**150/–**	**130/–**		*a*
Each	**13/6**	**11/9**		

When ordering please state Ref. No.



GAS DISTRIBUTION TUBES, (AG), **thimble form,** borosilicate glass, **with fritted thimble** providing a large surface area for rapid flow rates. These tubes are also suitable for use as immersion filters for removing large volumes of supernatant liquid from solid sediment. Available in two forms, with short nipple connection or with 30 cm suction tube. Thimble size 22 × 80 mm in two porosities, coarse (approx. equivalent to porosity 1) and fine (approx. equivalent to porosity 3).

List No.	Porosity	Tube length cm	Dozen	Each	
GD-840	Coarse	30	**380/–**	**35/–**	*a*
GD-842	Fine	30	**380/–**	**35/–**	*a*
GD-845	Coarse	3	**380/–**	**35/–**	*a*
GD-847	Fine	3	**380/–**	**35/–**	*a*

EUDIOMETER

GD-900

EUDIOMETER, Bunsen, capacity 50 cm³ graduated in 0·1 cm³. With sealed-in electrodes at the closed end.

Each **£2. 2. 0.** *a*

COMBUSTION PIPETTES

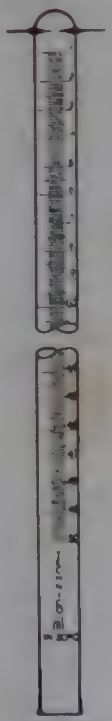
GD-910

GAS PIPETTE, Hempel explosion, (AG), borosilicate glass, with platinum electrodes, for use with levelling bulb ... ... Dozen **£22. 0. 0.** Each **£2. 0. 0.** *a*

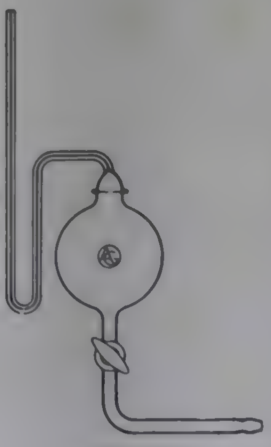
MF-920 **Mercury reservoir** suitable for use with above. For price see entry in List No. sequence.

GC-178

GAS PIPETTE, Harden slow combustion. For price and details see entry in List No. sequence.



GD-900

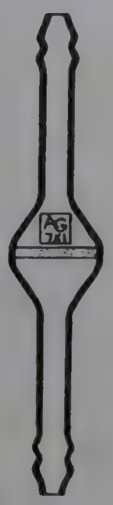


GD-910

All items on this page normally available from stock.

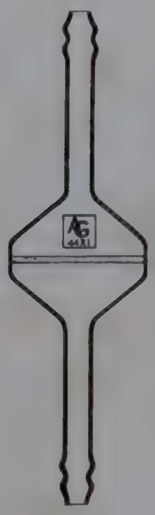
Regd.

FRITTED GLASS GAS FILTERS



7X

GD-950



44X
45X

GD-955

GD-950

GAS FILTER TUBES, (AG), borosilicate glass, with fritted glass plate of 30 mm dia. Overall length 150 mm. Ref. Nos. 7X1, 7X2, 7X3, 7X4. The tube 7X4 may also be used as a safety valve for mercury.

Dozen **£7. 10. 0.** Each **£0. 13. 6.** *a*

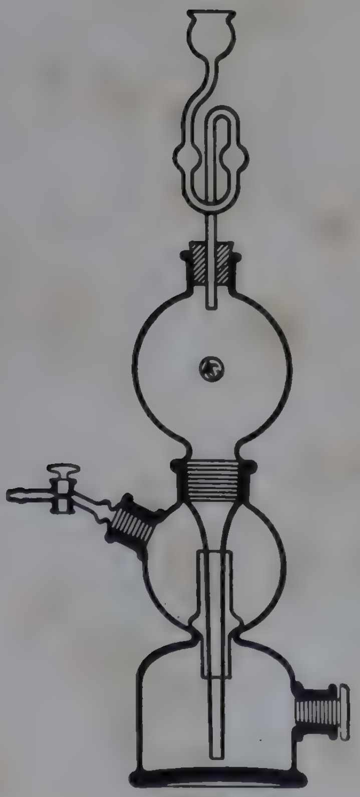
When ordering please state Ref. No.

GD-955

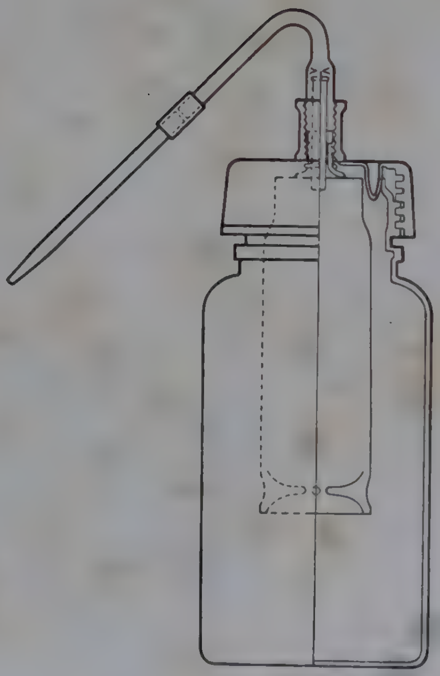
GAS FILTER TUBES, (Pipeline filters) (AG), borosilicate glass, with fritted glass plate.

Ref. Nos.	44X1 44X2 44X3 44X4	44X5	45X1 45X2 45X3 45X4	45X5	46X1 46X2 46X3 46X4	
Plate dia.	65	65	90	90	120 mm	
Overall length	230	230	260	260	350 mm	
Dozen	**360/–**	**570/–**	**680/–**	—	—	*a*
Each	**33/–**	**52/–**	**62/–**	**114/–**	**94/–**	

GAS GENERATORS



GE-055



GE-080

PETROL-AIR GAS GENERATORS
BOTTOGAS LABORATORY GAS SUPPLY
These are fully detailed in our catalogue 'Laboratory furniture and fittings' of which a copy will be sent on request.

GE-050

GAS GENERATOR, Kipp, borosilicate glass, capacity 1000 ml. With stoppered tubulure at bottom, loose fitting perforated centre cone, stopcock and safety funnel fitted with rubber stoppers.

Dozen **£55. 13. 9.** Each **£5. 3. 0.** *d'*

GE-055

GAS GENERATOR, Kipp, as GE-050 but with ground-in stopcock.

Dozen **£58. 0. 0.** Each **£5. 6. 0.** *d'*

REPLACEMENT PART

GE-060 **Centre cone,** for GE-050, and GE-055.
Dozen **£2. 14. 0.** Each **£0. 5. 10.** *d'*

FP-660 **Funnel,** thistle. For details and price see entry in List No. sequence.

GE-080

GAS GENERATORS, *Quickfit,* for preparing common gases required in the laboratory. The borosilicate glass reaction chamber is mounted inside a polythene bottle and connected by a screw thread adapter through a valve to a glass delivery tube. Without chemicals.

Ref. No.	2G	5G	10G	
Capacity	250	500	1000 ml	
Six off	**204/–**	**234/–**	**262/–**	*m*
Each	**37/–**	**43/3**	**48/6**	

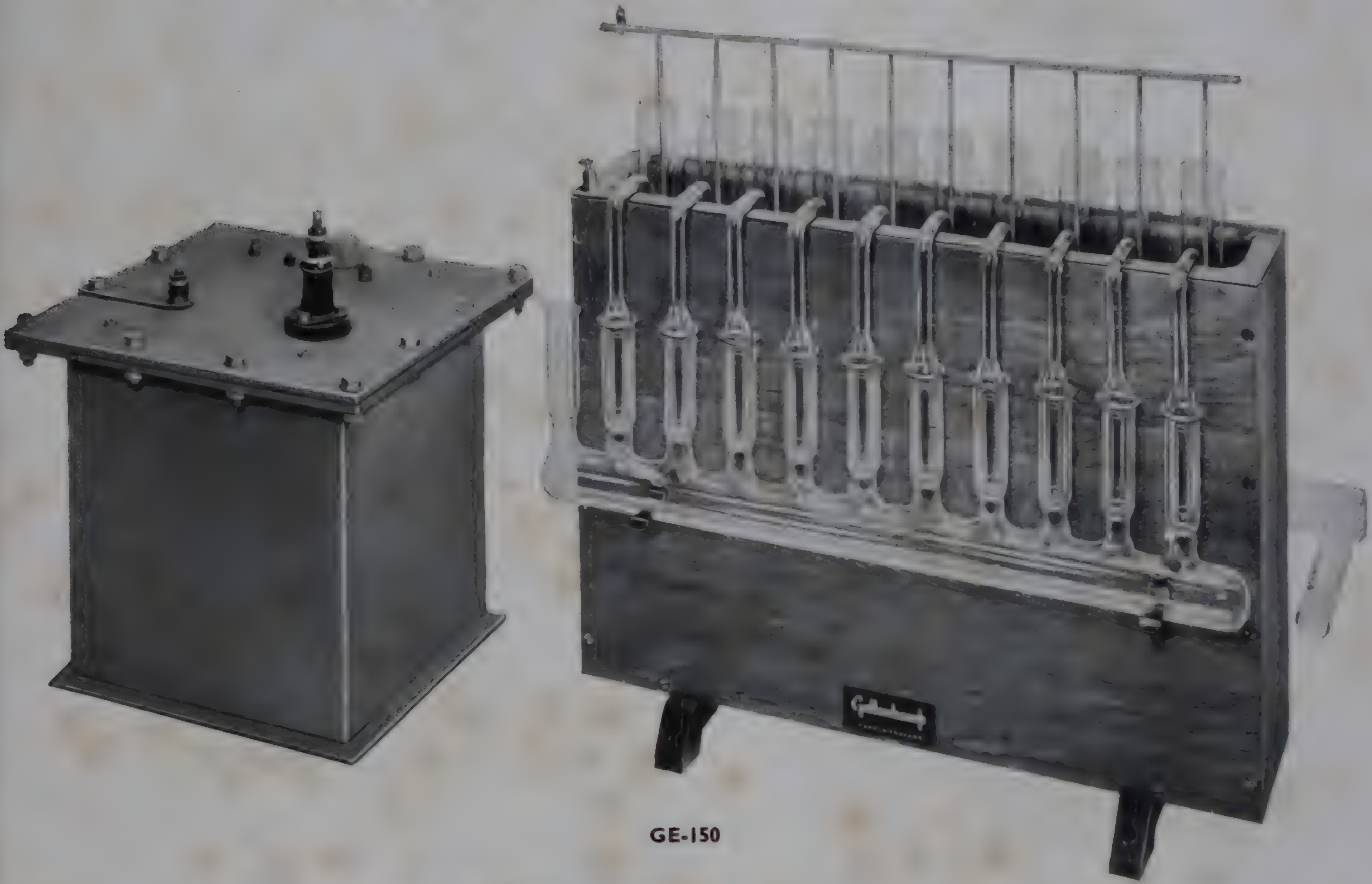
REPLACEMENT PARTS

GE-082 **Reaction chamber,** borosilicate glass.

Ref. No.	G2/250	G2/500	G2/1L	
Each	**8/9**	**10/–**	**12/–**	*m*

All items on this page normally available from stock.

Gallenkamp OZONE GENERATOR



GE-150

Ozone is a powerful oxidising agent with many laboratory applications including the oxidation of unsaturated organic materials and the preparation of organic peroxides. The ozone generator is a simple apparatus which can provide up to 150 ml/min of 6–7% ozonised oxygen.

PRINCIPAL AND OPERATION

Conversion of oxygen to ozone takes place when a high voltage is discharged through an oxygen atmosphere.

In this apparatus, the discharge is across the cylindrical space between the walls of a double walled soda glass cell. The middle compartment of the cell is filled with a weak copper sulphate electrolyte solution in which is immersed a metal electrode. The outside of the cell also is surrounded by the same electrolyte contained in a lead lined wooden tank. The 7500V output from the transformer is connected between the metal electrode and the lead lining and causes a silent electrical discharge to take place across the cell.

A steady stream of oxygen passed through the cell and emerges enriched with ozone.

DESIGN

The apparatus comprises ten ozoniser cells connected in parallel by means of an inlet manifold with mercury sealed bridge tubes. The combined output of the cells is collected in an outlet manifold fitted with a 14/23 interchangeable ground socket joint and outlet tube with 14/23 ground cone for connection to the apparatus in which ozone is required. A supply of oxygen regulated to 5 lb/in² is required but not provided.

Power rating, maximum	200 VA
Dimensions, transformer	29 × 30 × 20 cm
tank	38 × 18 × 47 cm
Weight, net	23 kg

WARNINGS

1. Ozone is not a dangerous substance to handle but some organic peroxides which can be prepared from it are liable to decompose with explosive violence.
2. Contrary to some belief ozone is toxic if inhaled for long periods.

GE-150

OZONE GENERATOR, *Gallenkamp*, as specification with ten ozoniser cells, lead lined wooden tank, inlet tube, inlet and outlet manifolds, outlet tube, electrodes and high voltage transformer. **Requires but does not include 1 kg mercury.** Includes operating instructions. For 200/250V 50 Hz single phase supplies.
Each **£84. 0. 0.** *b*

REPLACEMENT PARTS

GE-152	**Inlet tube,** soda glass	Each	**£0. 6. 6.**	*a*
GE-153	**Inlet manifold,** borosilicate glass.	Each	**£6. 0. 0.**	*a*
GE-154	**Ozoniser cell,** soda glass	Each	**£1. 11. 0.**	*a*
GE-155	**Outlet manifold,** borosilicate glass with 14/23 socket.	Each	**£6. 0. 0.**	*a*
GE-156	**Outlet tube,** borosilicate glass with 14/23 cone joint.	Each	**£0. 7. 0.**	*a*

ACCESSORIES

GD-405	**Gas cylinder,** filled with oxygen ...	For full details and prices see entries in List No. sequence.
GD-530	**Pressure regulator,** variable, two stage diaphragm type with contents gauge and outlet pressure gauge calibrated 0–30 lb/in²	
MF-932	**Mercury,** triple distilled	

All items on this page normally available from stock.

GF-052

GF-062

GF-090
GF-095

GAS METERS - WET TYPE

For the measurement of total gas volume used and, by timed observation, the measurement of the rate of gas flow. Suitable for inlet pressure up to 10 in water gauge maximum.

GF-052

GAS METERS, wet type, portable, operated on the Hyde principle with stainless steel drum in nylon bearings contained in an epoxy resin finished copper case. The meter is supported on three feet, two of which are adjustable. The connections are internally threaded for $\frac{1}{8}$ in b.s.p. with detachable nozzles for rubber tubing. The meter is fitted with a 15 cm dial, indicating pointer, a 99,999 revolution counter, water line box, thermometer recessed into dial and spirit level.

	litres	ft³	
Capacity/revolution	0·25	0·01	
Dial subdivision	0·005	0·0001	
Max. capacity/hour for accuracy ± 0·25%	60	2·4	
„ ± 0·5%	150	6	
Each	£43. 10. 0.	£43. 10. 0.	f

GF-062

GAS METER, wet type, of wide range and extremely versatile, operated by inlet pressure on a corrosion-resistant metal drum which has compartments formed by helical partitions. The drum is mounted on a stainless steel spindle and contained in a tinned copper case. The meter is supported on three feet, two of which are adjustable. The connections are threaded internally with detachable nozzles for rubber tubing. The meter is fitted with a 18 cm dial with indicating pointer, inner dial indicating hourly rate for 1 min observation, a 99,999 revolution counter, water line box, thermometer in protective casing and a spirit level.

	litres	ft³	
Capacity/revolution	2·5	0·1	
Dial subdivision	0·02	0·001	
Hourly rate dial to	150	6	
Max. capacity/hour for accuracy ± 0·25%	300	12	
„ ± 0·5%	450	15	
Each	£46. 10. 0.	£46. 10. 0.	f

GAS METERS - DRY TYPE

These meters are fitted with a central 15 cm dial with an outer scale indicating consumption and an inner scale showing the hourly rate of consumption by one minute's observation. For long period tests, a direct reading revolution counter is fitted. The meters should be used at rates of not less than 1 ft³/h and at inlet pressures of not more than 10 in water gauge.

List No.	Graduations		Each	
	Outer scale	Counter		
GF-090	2 ft³	9999 ft³	£33. 0. 0.	f
GF-095	50 litres	999 m³	£33. 0. 0.	f

GAS FLOWMETERS see FL-420 et seq. in List No. sequence.

All items on this page normally available from stock.

GAS SAMPLING

GF-400

GAS SAMPLING TUBE, (AG), **borosilicate glass,** to BS 2069 Type 1, with two stopcocks. Capacity 250 ml.
Dozen **£18. 0. 0.** Each **£1.13. 0.** *a*

GF-405

GAS SAMPLING TUBES, (AG), **borosilicate glass,** to BS 2069 Type 2, with two double oblique bore stopcocks.

Capacity	100	250 ml	
Dozen	**560/–**	**620/–**	*a*
Each	**51/–**	**56/–**	

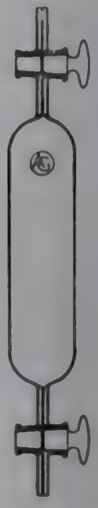
GF-415

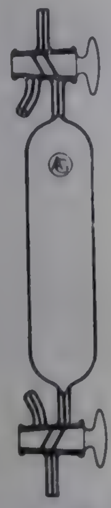
GAS SAMPLING SYRINGE, 100 ml, with scale subdivided 1 ml. The precision ground barrel and plunger give a very low rate of gas leakage making the syringe eminently suitable for gas sampling, mixing and transfer. The tapered delivery nozzle is 40 mm long and fits 6 to 6·5 mm bore flexible tubing ... Each **£3. 18. 6.** *m*

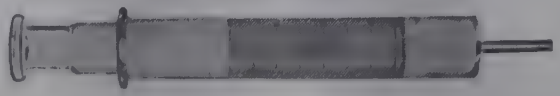
GF-430

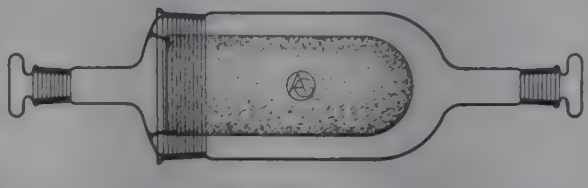
GAS SAMPLING ASPIRATOR, consisting of rubber bellows with hard plastics end covers, leather strap handles and plastics nozzle and indicator. Capacity about 2·8 litres ... ... Each **£14. 10. 0.** *m*

Rubber blowballs see RUBBER SUNDRIES.


GF-400


GF-405


GF-415


GF-470

GF-470

DUST AND MOISTURE ESTIMATION APPARATUS, (AG), comprising a glass vessel with ground sockets and stoppers in which a 30×77 mm absorption thimble may be fitted. The gas being sampled is passed through the apparatus, dust collecting in the thimble, and then through two drying tubes where water is absorbed. As some water is retained by the thimble, it is necessary to weigh before and after drying. **Without drying tubes** ... ... Each **£2. 2. 0.** *a*

GF-473 **Absorption thimbles,** 30×77 mm, double thickness, suitable for above apparatus. Box of 25 **£1. 7. 6.** *m*

For suitable **drying tubes** see AB-655 and AB-665.

GAS WASHBOTTLES

GF-480

BOTTLES, Woulff, 2 necks, borosilicate glass.

Capacity	250	500	1000 ml	
Socket No.	14/23	14/23	19/26	
Dozen	**202/–**	**238/–**	**340/–**	*d*
Each	**18/8**	**22/–**	**31/6**	

GF-482

BOTTLES, Woulff, 3 necks, borosilicate glass.

Capacity	250	500	1000 ml	
Socket No.	14/23	14/23	19/26	
Dozen	**224/–**	**281/–**	**394/–**	*d*
Each	**20/9**	**25/6**	**36/6**	

GF-484

BOTTLES, Woulff, 3 necks, borosilicate glass, with tubes and stopper.

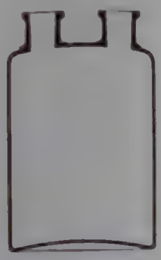
Capacity	250	500	1000 ml	
Socket No.	14/23	14/23	19/26	
Dozen	**460/–**	**520/–**	**660/–**	*m*
Each	**42/–**	**47/–**	**60/–**	

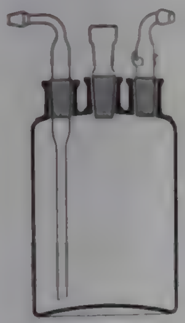
REPLACEMENTS

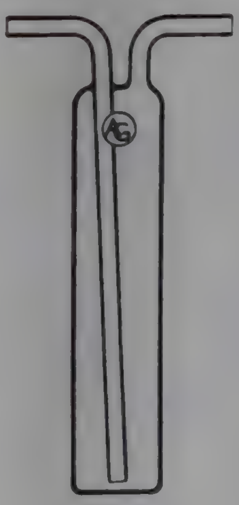
Joint size	14/23	19/26
Long entry tube Short exit tube Stopper	Q-MF 15/1B Q-MF 10/1B Q-SB 14	Q-MF 15/2B Q-MF 10/2B Q-SB 19
For prices see entries in *Quickfit* section.		

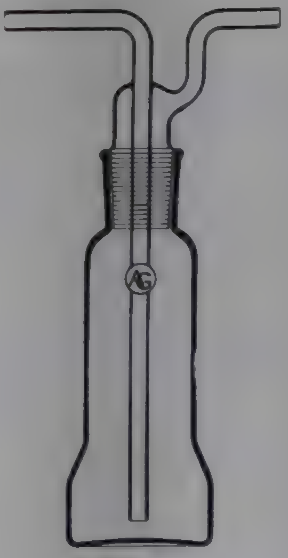
GF-500

GAS WASHBOTTLE, (AG), to BLWA specification TCD 125. Capacity 40 ml, body length 10 cm, diameter 2·5 cm.
Dozen **£4. 10. 0.** Each **£0. 8. 6.** *a*


GF-480


GF-484


GF-500


GF-520

GF-520

GAS WASHBOTTLES, Drechsel, (AG), to BS 2461, with interchangeable ground-in head and 24/29 joints.

Capacity	125	250	500 ml	
Dozen	**220/–**	**230/–**	**285/–**	*a*
Each	**20/–**	**21/–**	**26/–**	

REPLACEMENT PARTS for GF-500 and GF-520

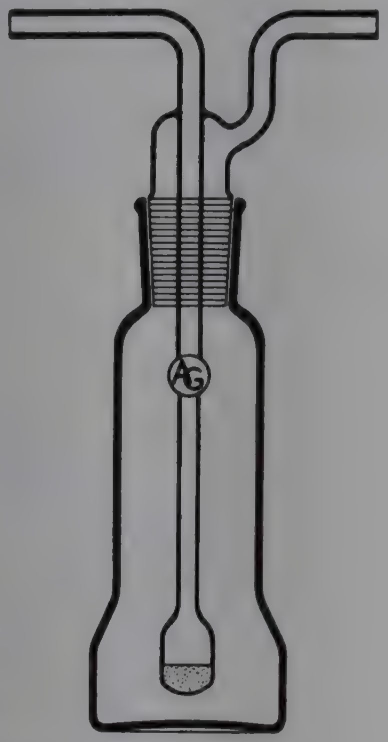
GF-522 **Head,** with 24/29 cone and distribution tube of length suitable for 500 ml bottle which the user can cut down when required on the smaller bottles.
Dozen **£6. 10. 0.** Each **£0. 11. 9.** *a*

GF-544 **Bottles,** see entry on next page.

All items on this page normally available from stock.

GAS WASHBOTTLES WITH AG FRITTED DISTRIBUTORS
Regd.

GF-540



GF-540

GAS WASHBOTTLES, Drechsel, AG, with domed fritted glass plate on the distribution tube for efficient dispersion and washing. Comprises bottle and interchangeable ground-in head, joint size 24/29.

Ref. Nos.	64X0 64X1 64X2	65X0 65X1 65X2	67X0 67X1 67X2	
Capacity	125	250	500 ml	
Dozen	**320/–**	**340/–**	**400/–**	*a*
Each	**29/–**	**31/–**	**36/–**	

REPLACEMENT PARTS

	Bottle size		125	250	500 ml	
GF-542	**Head**	Dozen	**230/–**	**245/–**	**255/–**	*a*
		Each	**21/–**	**22/6**	**23/6**	
GF-544	**Bottle**	Dozen	**88/–**	**96/–**	**140/–**	
		Each	**8/3**	**9/–**	**12/9**	

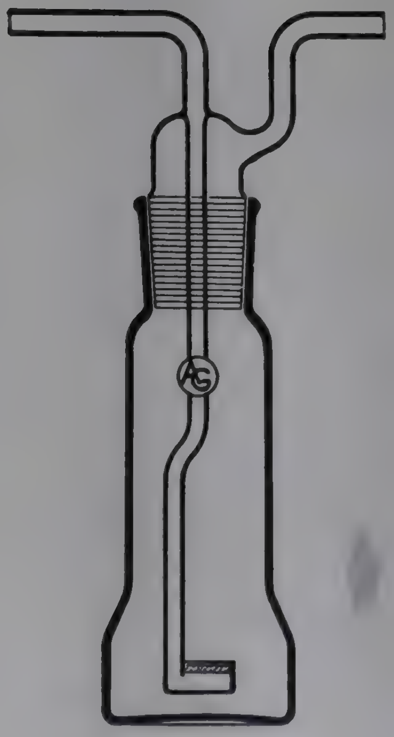
GF-560

GAS WASHBOTTLES, Drechsel, AG, with flat fritted glass plate in the distribution tube. Comprises bottle and interchangeable ground-in head.

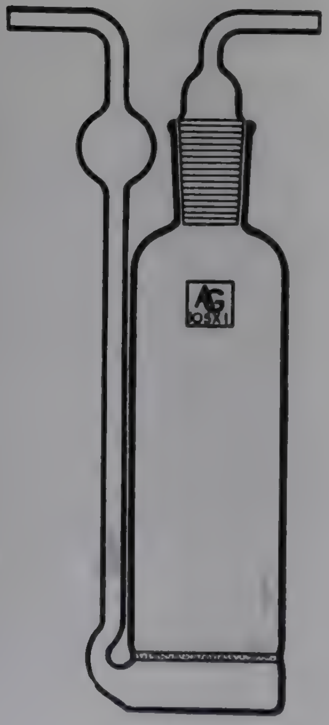
Ref. Nos.	66X0 66X1 66X2	68X0 68X1 68X2	
Capacity	125	250 ml	
Joint size	29/32	40/38	
Dozen	**400/–**	**480/–**	*a*
Each	**36/–**	**44/–**	

REPLACEMENT PARTS

	Bottle size Joint size		125 29/32	250 ml 40/38	
GF-562	**Head**	Dozen	**275/–**	**350/–**	*a*
		Each	**25/–**	**32/–**	
GF-570	**Bottle**	Dozen	**125/–**	**135/–**	
		Each	**11/3**	**12/–**	



GF-560



GF-580

GF-580

GAS WASHBOTTLES, AG, with large diameter fritted glass plate giving excellent absorption at very high flow rates.

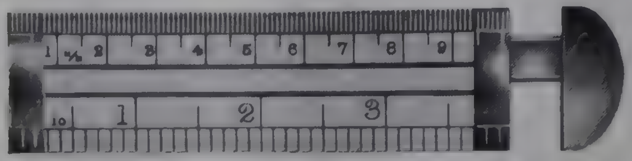
Ref. Nos.	105X1	101X1	
Capacity	100	500 ml	
Plate diameter	40	65 mm	
Joint size	19/26	29/32	
Dozen	**430/–**	**620/–**	*a*
Each	**39/–**	**56/–**	

All items on this page normally available from stock.

GAUGES FOR LINEAR MEASUREMENTS

GJ-100

CALIPER, boxwood, with brass slide 4 in long, and two verniers reading to 0·1 mm and 0·01 in.
Each **£0.14. 6.** *m*


GJ-100

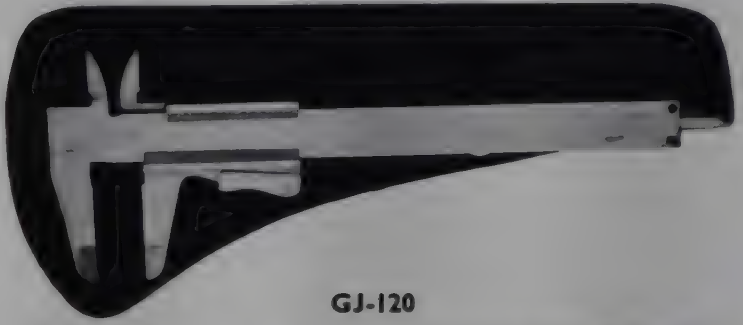
***GJ-110**

CALIPER, plated steel, with thumb roller and locking screw, for external, internal and depth measurements. Two scales 0—12 cm and 0—5 in, each with vernier reading to 0·1 mm and 1/128 in respectively. Maximum jaw opening 11 cm (4⅜ in) ... ... Each **£1. 5. 0.** *m*

GJ-110

***GJ-120**

CALIPER, precision, hardened stainless steel, to BS 887, with thumb release lock, for external, internal and depth measurements. The jaws and cross horns are precision ground with chamfered and relieved ends for measuring small objects. Two scales 0—16 cm and 0—6 in, each with vernier reading to 0·1 mm and 0·001 in respectively. Maximum jaw opening 14 cm (5½ in).
Each **£5. 16. 0.** *m*

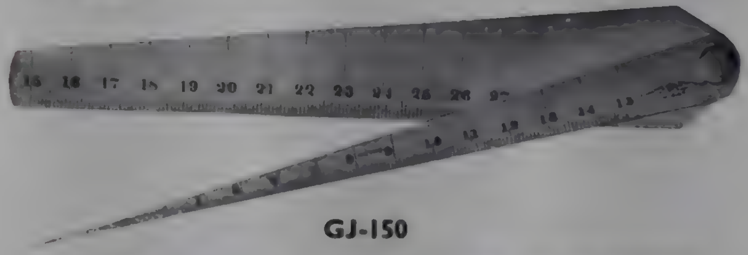

GJ-120

GJ-148

TUBING GAUGE, tapered steel, for measuring internal diameters, range 1 to 15 mm in 0·1 mm.
Each **£2. 8. 6.** *m*

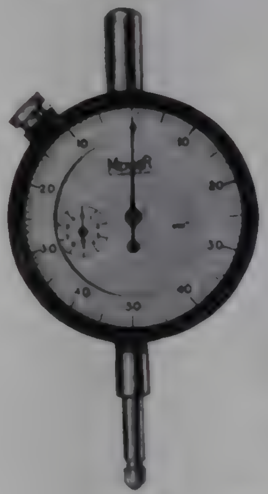
GJ-150

TUBING GAUGE, tapered steel, in two sections, ranges 1 to 15 mm and 15 to 30 mm in 0·1 mm.
Each **£4. 16. 9.** *m*


GJ-150

GJ-180

DIAL GAUGE, 2¼ in dia. dial, with scale 0–100, reading in 0·001 in. The dial and bezel rotate through 360° for zero setting. The stainless steel rack spindle has a range of movement of 0·5 in ... ... Each **£4. 2. 6.** *f*

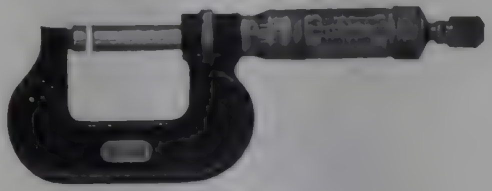

GJ-180

GJ-190

DIAL GAUGE, as GJ-180, but reading in 0·01 mm, with spindle travel 12 mm ... ... Each **£4. 2. 6.** *f*

GJ-200

MICROMETER-SCREW GAUGE, steel, with scale, 0–25 mm, graduated to read in 0·01 mm. Fitted with ratchet and locknut ... ... Each **£3. 7. 6.** *m*


GJ-200

GJ-205

MICROMETER-SCREW GAUGE, steel, with dual scales, 0–25 mm graduated to read in 0·01 mm, and 0–1 in graduated to read in 0·0004 in.
Each **£4. 6. 0.** *m*

GJ-205

GJ-250

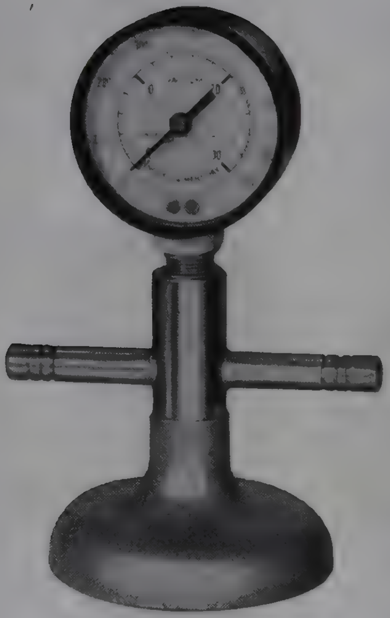
SPHEROMETER, reading 0·01 mm. The head, marked in 100 divisions, on a screw with 1 mm pitch, registers on a scale, range 20 mm. The frame has three feet on 4·5 cm P.C.D. ... ... Each **£1. 11. 0.** *m*

GJ-250

All items on this page normally available from stock.

Gallenkamp
20
40
60
80
100
lb/in²
kg/cm²
1
2
3
4
5
6
7

GJ-300



GJ-330 with GJ-350

GAUGES FOR VACUUM AND PRESSURE MEASUREMENT

GJ-300

PRESSURE GAUGES, Bourdon tube, to BS 1780, with 5 cm dia. dial, scaled kg/cm^2 and lb/in^2. The shank is screwed ⅛ in B.S.P.

Scale	0–1 0–15	0–2 0–30	0–4 0–60	0–7 kg/cm^2 0–100 lb/in^2	
Dozen	**245/–**	**245/–**	**245/–**	**245/–**	c
Each	**22/6**	**22/6**	**22/6**	**22/6**	

GJ-330

VACUUM GAUGE, Bourdon tube, to BS 1780, with 5 cm dia. dial, scaled 0–760 mm and 0–30 in Hg. below atmospheric pressure. The shank is screwed ⅛ in B.S.P. ... ... Dozen **£12. 5. 0.** Each **£1. 2. 6.** c

Dozen rate applies also to orders of assorted ranges of GJ-300 and GJ-330.

PRECISION VACUUM GAUGE, capsule dial type, see **VACUUM APPARATUS.**

GJ-350

STAND, for use with pressure gauges, GJ-300, and vacuum gauge GJ-330. Consists of a brass holder screwed ⅛ in B.S.P., with horizontal tubing connectors, 9 mm external dia., and a cast iron base, 7·5 cm dia. Each **£0. 9. 0.** *b*

OTHER GAUGES will be found in this catalogue under the following headings.

Air pump gauges	See Air Pumps
Steam pressure gauges	See Autoclaves
Bomb calorimeter gauges	See Calorimeters
Filter pump gauge	See Filter Pumps
Gas cylinder gauges	See Gas Cylinders
Manometer gauges	See Manometers
Coating thickness gauges	See Paint Testing and Metallurgy
Pressure vessel gauges	See Filter Presses
Vacuum gauges	See Vacuum Apparatus

GAUZES

GK-100

GAUZES, WIRE, iron, cut in squares.

Square	12·5	15 cm	
Gross	**90/–**	**125/–**	c
Dozen	**8/6**	**11/3**	

GK-105

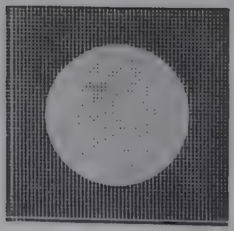
GAUZES, WIRE, iron, cut in squares, with asbestos centres.

Square	12·5	15 cm	
Gross	**175/–**	**205/–**	c
Dozen	**16/–**	**18/6**	
Each	**2/11**	**3/2**	

GK-150

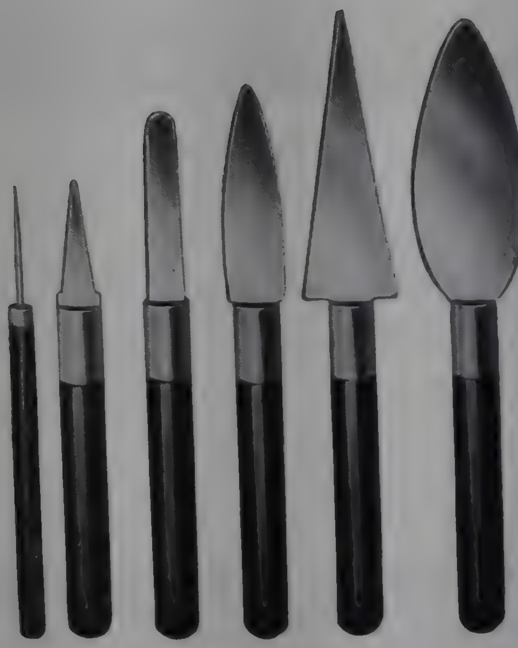
GAUZE, nylon, 100 cm wide, cut to any length. Mesh 100 holes/in ... ... Per ft **£1. 2. 6.** c

GK-100



GK-105

All items on this page normally available from stock.



GP-100, GP-105

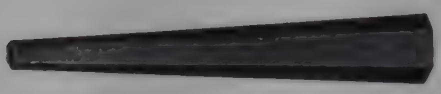
GP-100

GLASSBLOWING TOOLS, with brass blades except for No. 1, which has a nickel-chromium spike.

Pattern No.	1	2	3	4	5	6	
Dozen	64/–	86/–	86/–	94/–	94/–	106/–	c
Each	6/6	8/3	8/3	8/9	8/9	9/9	

GP-105

GLASSBLOWING TOOLS, set of 6, Pattern Nos. 1 to 6 ... Dozen sets **£27.10. 0.** Set **£2.10. 0.** c

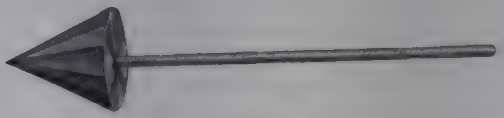


GP-130

GP-130

GLASSBLOWING TAPERS, *Gallenkamp*, light metal alloy, hexagonal in section, 150 mm long, standard taper of 1 in 10, for opening out and flanging tubes.

Size	A	B	C	D	E	
Large end	15	25	35	45	55 mm	
Small end	1·3	10	20	30	40 mm	
Dozen	78/–	112/–	175/–	215/–	280/–	b
Each	7/8	10/3	16/–	19/6	25/6	

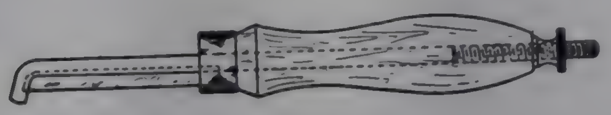


GP-140

GP-140

GLASSBLOWING CONES, *Gallenkamp*, light metal alloy, for spinning and flanging tubes.

Dia. of cone	25	50 mm	
Dozen	82/–	125/–	b
Each	7/10	11/3	



GP-175

GP-175

GLASS-CUTTING KNIFE, a knife with which sharpening time is eliminated by using expendable blades of hardened steel. An ideal economy knife for the laboratory worker as well as for the professional glassblower. Supplied with twelve spare blades.
Dozen **£4.18. 0.** Each **£0. 9. 0.** b

REPLACEMENT PART

GP-176 **Blades** ... Gross **£0.19. 6.** Dozen **£0. 3. 3.** b

GP-180

GP-180

GLASS-CUTTING KNIFE, *Gallenkamp*, for use with both borosilicate and soda glass. The cutting edge is double ground tungsten carbide, 32 mm long, bonded to a diecast aluminium holder, 112 mm long. With silicon carbide sharpening stone, in leather case.
Dozen **£17. 0. 0.** Each **£1.11. 0.** b

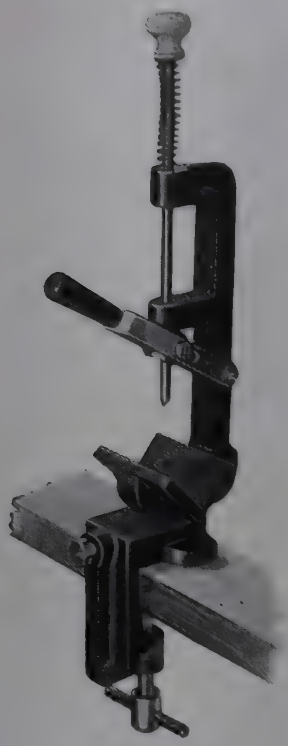
GP-182

GLASS-CUTTING KNIFE, *Gallenkamp*, as GP-180, but without sharpening stone or case.
Dozen **£10.10. 0.** Each **£0.19. 0.** b

GP-184

SHARPENING STONE, silicon carbide.
Dozen **£2. 4. 0.** Each **£0. 5. 0.** c

All items on this page normally available from stock.



GP-190

GP-190

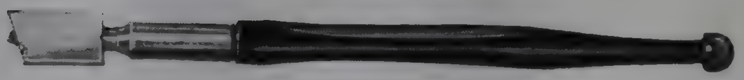
GLASS-CUTTING TOOL, for bench mounting. The glass tube is rotated and a true ring cut by the diamond which is brought in contact with the tube by pressing down the lever handle.
Each **£9. 0. 0.** *c*

GP-195 Spare rod, with diamond tip ... Each **£2. 8. 0.** *c*

GP-200

GP-200

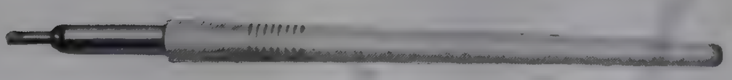
GLASS-CUTTING TOOL, with diamond, for cutting circles from 3 in up to 36 in dia. ... Each **£10. 4. 0.** *c*



GP-210

GP-210

GLASS-CUTTING DIAMOND, mounted in metal, with wooden handle ... ... Each **£1. 7. 6.** *m*



GP-225

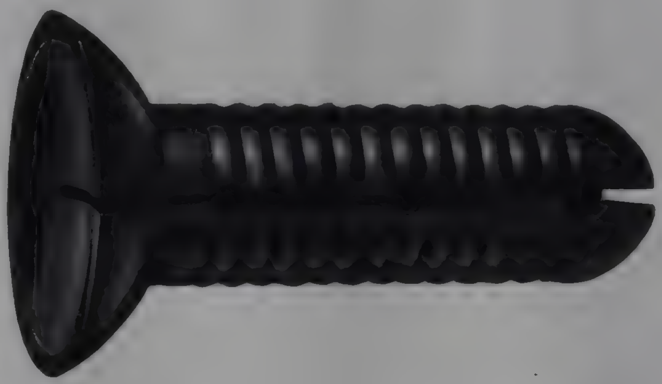
GP-225

GLASS WRITING DIAMOND, mounted in metal, with plastics handle ... ... Each **£0.17. 6.** *m*

GP-230

GP-230

GLASS WRITING DIAMOND, pocket pattern with retractable diamond point and safety pocket clip.
Each **£1. 1. 0.** *m*



GP-300

SAFETY GRIP, for manipulating glass tubing, thermometers, etc. This is a safety device which should be in every laboratory. It is used for inserting glass tubing into rubber stoppers or corks, and protects the hands and wrists from splinters caused by breakage of the glass. It can also be used for breaking glass tubing after marking with a glass file ... ... Each **£0.16. 3.** *m*

The following items in the catalogue will be useful for glassblowing purposes and full details will be found in List No. sequence.

ASBESTOLITE, see FW-680
BLOWPIPES, see BR-150 to BR-200
ETCHING INK, see GR-200
FORCEPS, see DR-030, DR-032
GLASS TO METAL SEALS, see GR-250
GLASS ROD, see RT-020, RT-030
GLASS TUBING, see TX-250 to TX-290
GLOVES, asbestos, see CP-770, CP-775
GOGGLES, see CP-838
OXYGEN CYLINDERS AND REGULATORS, see GD-405 et seq.
PENCILS, glass marking, see PC-910
SPECTACLES, see CP-890 with CP-894

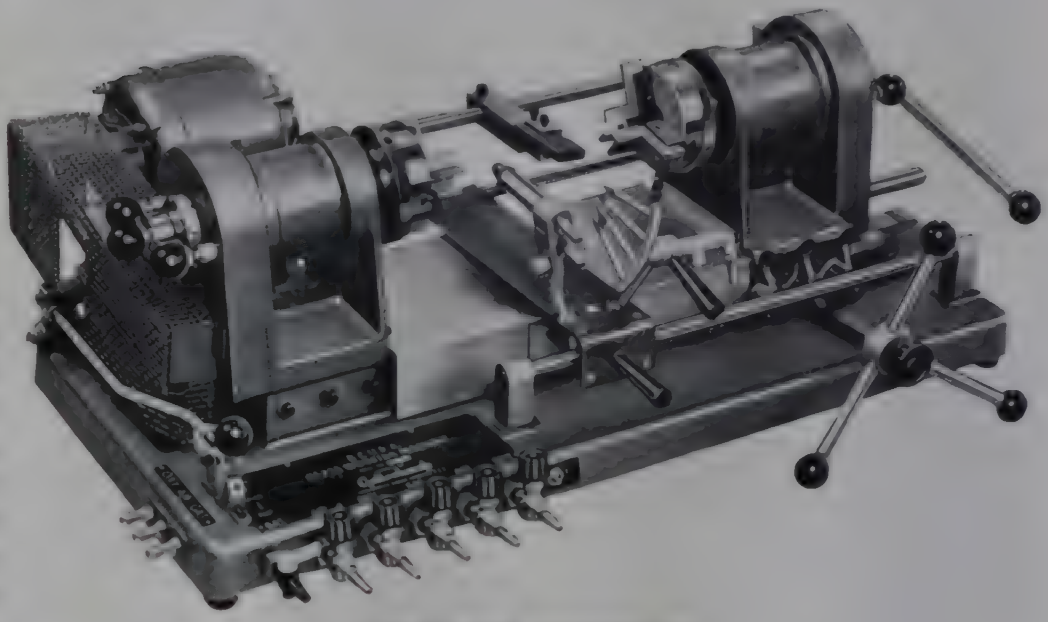
All items on this page normally available from stock.

B.C.U.R.A. GLASS WORKING LATHE

Developed in association with the British Coal Utilisation Research Association

- **Permits intricate work by semi-skilled operator**
- **Increases productivity for skilled glassblower**
- **Research and development 'specials' made in the laboratory**
- **Speeds repetition production in the factory**
- **Reduces production costs**
- **Works borosilicate or soda glass**
- **Range of tools for all types of operation**

Equally suitable for 'one off' or routine production for: Straight joins · Internal seals · Flanging · Tabulating · Neck forming · Bulb blowing · Cone and socket joints · Pinch making · Graded seals · Glass to metal seals · Stopcock parts.



GP-400 with accessories

SPECIFICATION

The lathe comprises a fixed headstock and a traversing tailstock, which can be locked in position, all mounted on a substantial cast base. A capstan handwheel operates the tailstock and also moves a sliding metal cover over the driving shaft to protect the working parts from dirt and broken glass. An integral $\frac{1}{4}$ hp electric motor, with a continuously variable speed drive, provides a speed range from 120 to 500 rev/min. The chucks are driven synchronously and are individually compensated for backlash. All driving shafts run in easily replaceable ball bearings. The burner mounting bridge runs freely on guide rails and the burners can be positioned smoothly between the chucks. A horizontal bar, fitted with a tool mounting clamp and an operating lever, is situated at the rear of the lathe. The tool mounting clamp can be locked in any position horizontally along the bar, and the vertical arc movement of the tool is governed by an adjustable limit stop on the operating lever. Nozzles for flexible tubing are provided for connecting to the air, gas and oxygen services. The supplies for the two burners are taken from two sets of control valves conveniently placed for the operator's left hand.

BURNERS

Two standard burners are available; both may be used with gas-air and gas-oxygen mixtures:

1. An efficient cannon burner complete with three interchangeable jets giving a wide range of flame sizes and intensities. When working borosilicate glass an air bleed must be introduced, by means of a T-tube, into the oxygen line to prevent damage by overheating of the burner jets.
2. A four-jet crossfire burner with interchangeable jets and integral oxygen injector.

Each burner is clamped on a ball joint to allow easy one-handed manipulation of the burner to any position.

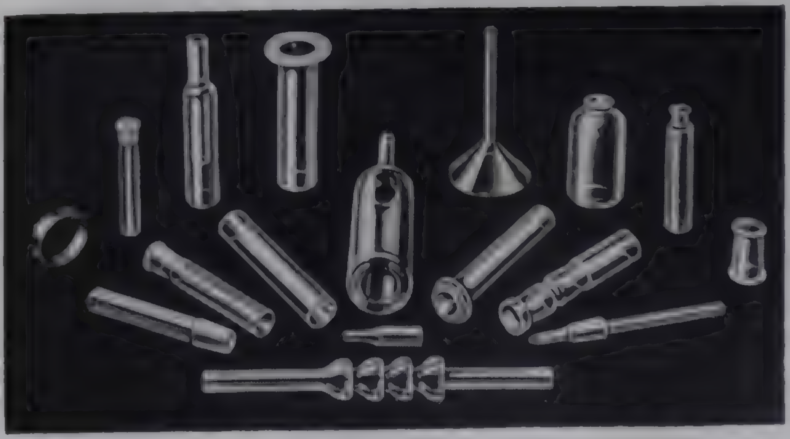
A *Flamemaster* hand torch listed under BR-240 is a useful accessory for certain types of special work.

TOOLS

Two standard tools which can be shaped by the user are available:-

1. A flat rectangular carbon tip for use in the tool mounting clamp.
2. A cylindrical carbon tip for mounting in the tailstock chuck when this has been disconnected from the drive. The tailstock traverser is used to position the tool.

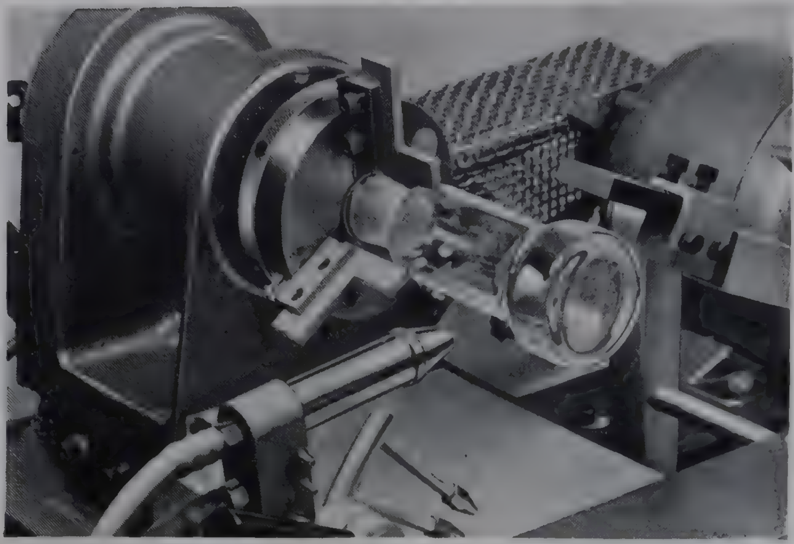
Bulb blowing to special shapes can often be done by using profile moulds, which can be made by the user either from flat carbon tips or sheet metal, and mounted in the tailstock chuck.



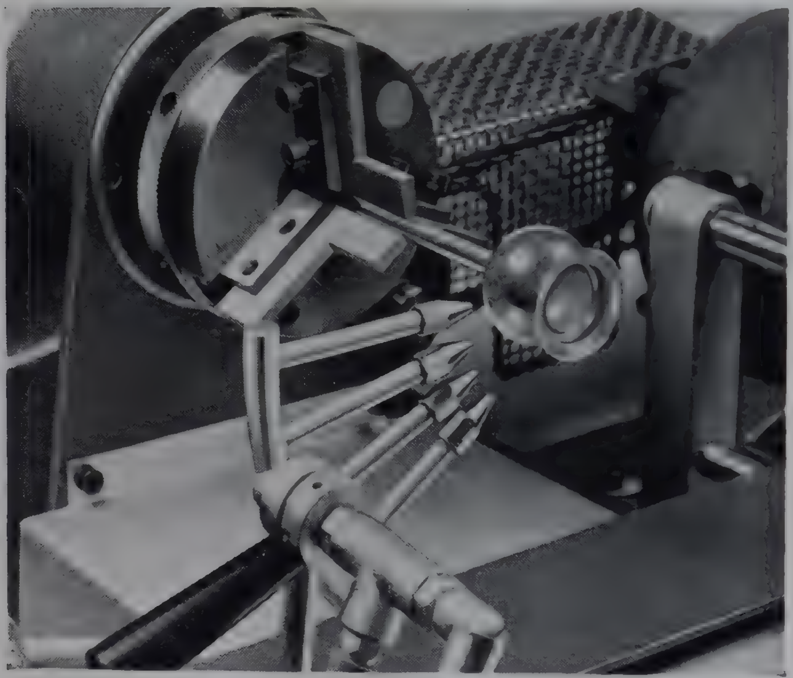
Samples of work made on machine

B.C.U.R.A. GLASS WORKING LATHE

(continued)



Cannon burner on Drechsel gas wash bottle



Crossfire burner on thistle funnel

SERVICES REQUIRED

Gas — towns gas at approximately 50 mm w.g. minimum.
For LPG and other industrial gases see below.
Air — at approximately 0·7 kg/cm² (10 lb/in²)
Oxygen — up to approximately 1·4 kg/cm² (20 lb/in²)
Electricity — 220/240V 50 Hz single phase supplies.

DIMENSIONS AND DATA

Chuck bore size	32 mm
Maximum distance between chuck faces	345 mm
Minimum distance beteeen chuck faces	130 mm
Chuck jaw opening, approximately	75 mm
Bed to chuck centre distance	110 mm
Overall length of lathe	915 mm
Overall width of lathe	710 mm
Chuck speed variable between	120 and 500 rev/min
Weight, approximately	54 kg

GP-400

GLASS WORKING LATHE, B.C.U.R.A., as specification, including headstock and tailstock assemblies and motor drive, but without chucks, burners, flexible tubing or tools. For 220/240V 50 Hz single phase supplies. Complete with instructions.

Each **£410. 0. 0.** *d*

Machines for other electrical supplies, quotation on application.

GP-402

GLASS WORKING LATHE, B.C.U.R.A., a complete working outfit comprising the following:

GP-400	Glass working lathe
GP-415	Crossfire burner for town's gas
GP-420	Cannon burner for town's gas
GP-425	Flat forming tool
GP-426	Carbon tip, pack of 6
GP-430	Flanging tool
GP-431	Carbon tip, pack of 6
GP-435	Hand tool handle
GP-440	Headstock 3-jaw chuck
GP-445	Tailstock 3-jaw chuck
GP-448	Blowing attachment
GP-450	Blowing swivel

Each **£495. 0. 0.** *d*

Outfits as GP-402, but for use with LPG or other industrial gases are available. Quotation on receipt of full details of gas to be used.

ACCESSORIES AND REPLACEMENTS

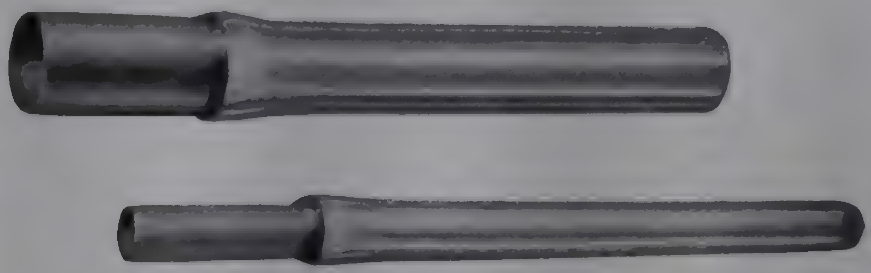
GP-415	**Crossfire burner** for town's gas ...	Each **£17. 10. 0.**	*m*
GP-420	**Cannon burner** for town's gas ...	Each **£7. 5. 0.**	*m*
GP-425	**Flat forming tool**, with rectangular carbon tip.	Each **£7. 15. 0.**	*m*
GP-426	**Carbon tip**, replacement for GP-425.	Pack of 6 **£1. 15. 0.**	*m*
GP-430	**Flanging tool**, with cylindrical carbon tip.	Each **£7. 0. 0.**	*m*
GP-431	**Carbon tip**, replacement for GP-430.	Pack of 6 **£0. 10. 0.**	*m*
GP-435	**Hand tool handle**	Each **£3. 12. 6.**	*m*
GP-440	**Headstock 3-jaw chuck**, mounted complete on backplate with fixing screws	Each **£31. 10. 0.**	*m*
GP-445	**Tailstock 3-jaw chuck**, mounted complete on backplate with fixing screws	Each **£31. 10. 0.**	*m*
GP-448	**Blowing attachment**, for mounting on outer end of either mandrel	Each **£3. 5. 0.**	*m*
GP-450	**Blowing swivel**, for mounting in end of glass tube projecting through headstock mandrel.	Each **£1. 15. 0.**	*m*
GP-455	**Independent 4-jaw chuck**, for use on headstock, mounted complete on backplate with fixing screws.	Each **£31. 10. 0.**	*m*
GP-460	**Main drive belt**	Each **£0. 8. 0.**	*m*
GP-461	**Motor drive belt**	Each **£0. 8. 0.**	*m*
GP-470	**Instruction manual**, additional copies.	Each **£0. 11. 0.**	*m*
AF-445	**Air pump**, to supply compressed air to burners.	For prices see entries in List No. sequenee.	
BR-240	**Hand blowpipe**, *Flamemaster* and accessories.		
GP-100	**Glassblowing tools.**		
GP-130	**Glassblowing tapers.**		
GP-140	**Glassblowing cones.**		
GP-180	**Glass cutting knife.**		
TX-865	**T-tubes**, 36×6 mm for using cannon burner with oxygen-air mixtures.		
TX-525	**Tubing**, medium wall M6·5.		

All items on this page normally available from stock.

GR-100

GLASS BALLS, solid, for use as packing in gas absorption or washing tubes.

Dia. approx.	3	4	6 mm	
Per lb	**17/–**	**17/–**	**17/–**	c



GR-250

GR-140

GLASS TAPE, close woven, suitable for binding, insulation or tying. Reels of approx 45 metres, 20 mm wide, 0·25 mm thick.

Dozen **£10. 10. 0.** Each **£0. 19. 0.** c

GR-150

GLASS WOOL, specially prepared glass fibres for filtration purposes.

Per lb **£0. 5. 0.** c

GR-160

QUARTZ WOOL, fused *Vitreosil*, consists of a mass of very fine quartz fibres of average dia. 6 μm, resembling cotton wool in appearance. It is used in the filtration of acid liquids and hot gases, as separating plugs for fillings in combustion tubes... Per pack of 10 g. **£1. 7. 6.** m

GR-200

GLASS ETCHING INK, for writing on glass with an ordinary pen, 1 oz plastics bottle. Bottle **£0. 7. 0.** c

GR-250

GLASS TO METAL SEALS, made from highest quality metal alloy tubing joined via a 4-stage graded seal to borosilicate glass. The metal portion may be joined to metal apparatus by soft soldering or, provided sudden heat is not applied, may be silver-soldered or brazed. The glass, with expansion coefficient $3{\cdot}2\times10^{-6}$, seals readily to all common borosilicate laboratory glassware. The seals are suitable for high vacuum work, and are supplied fully annealed and chemically cleaned.

Dia. external	6	13	19	25 mm	
Length metal + seal	12	12	18	25 mm	
Length glass	75	75	100	100 mm	
Each	**24/6**	**25/–**	**30/–**	**32/–**	m

GLASS FIBRE FILTERS	see FILTER PAPERS
GLASS TUBING	see TUBING
GLASSWARE DRYERS	see OVENS, also WASHING & DRYING EQUIPMENT
GLOVE BOXES	see MANIPULATOR BOXES
GLOVES **GOGGLES**	see CLOTHING, protective
GOOCH CRUCIBLES	see CRUCIBLES
GRINDERS	see MILLS and GRINDERS

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for standard packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'dozen' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about 50/0d. per dozen.

This system is intended to encourage ordering in standard packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

All items on this page normally available from stock.

HAEMACYTOMETERS see MEDICAL SCIENCES
HEAT TREATMENT see FURNACES

HD-100

HD-113 to HD-115

ELECTRIC IMMERSION HEATERS

HD-100

HEATERS, immersion, portable type, with heating element sheathed in plated copper tube. An extremely convenient low wattage heater fitted with a thermally and electrically insulated handle and a length of 3-core cable. For 220/240V supplies.

Length	7	7	9 in	
Loading	300	500	1000W	
Each	**57/9**	**54/2**	**72/3**	*m*

Other voltages available to order.

HEATERS, immersion, *Electrothermal 'Red-Rod'* comprising a heating element totally enclosed in a silica sheath, complete with 6 ft (1·8 m) of 2-core connecting cable. A radiant immersion heater which will go up to red heat, suitable for heating liquids in beakers, tanks, water-baths, etc. For 230/250V supplies.

List No.	Watts Loading	Overall length in	Heated length in	Each	
HD-113	300	10	5	**£4. 5. 0.**	*m*
HD-114	400	12	6½	**£4. 12. 6.**	*m*
HD-115	500	14	7¾	**£5. 0. 0.**	*m*

Other voltages available to order.

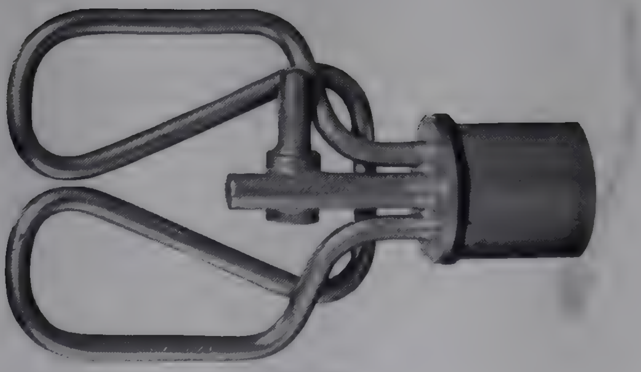
HD-152

HD-152

HEATERS, immersion, with $\frac{5}{16}$ in diam. nickel plated copper sheathed hairpin element mounted under a flanged head threaded 1·55 in. diam. × 26 t.p.i. Suitable for use in water and oil baths either vertically or mounted through a suitable hole in the side of the bath. Terminals are enclosed with gland entry for cable connection. Supplied complete with two joint rings and threaded locking ring. For 220/240V supplies.

Loading	250	500	1000W	
Length overall	37	45	53 cm	
Length of hairpin	30	37	45 cm	
Length of heated section	25	31	37 cm	
Each	**62/–**	**64/–**	**66/–**	*m*

Other voltages available to order.


HD-180

HD-180

HEATERS, immersion, safety type, with tubular element in rectangular nickel plated copper sheath. Fitted with BS 3283 3-pin safety connector which is automatically ejected if the water level falls below the safe limit. Suitable for heating medium capacity waterbaths and requiring 1$\frac{9}{16}$ in (44·5 mm) hole for mounting. Complete with sealing washers, threaded locking ring and connector. For 110/120, 200/210 or 220/240V supplies.

Loading	750	1000	1500	2000	W	
Immersion length from flange	110	132	132	132	mm	
Width	88	117	117	117	mm	
Each	**36/–**	**36/–**	**36/–**	**36/–**		*m*

When ordering heaters please specify voltage.

All items on this page normally available from stock.

RADIANT HEATERS

HD-230

HEATERS, RADIANT, *Vitreosil*, with element totally enclosed in fused silica and completely protected from acid vapours. This heater is designed to enable heating to be carried out from above, thus ensuring rapid evaporation without loss by spattering. It may also be inverted and used as a normal hotplate. Heating surface dia. 12·5 cm. Loading 400W. For 220/240V supplies.

Each **£15. 18. 0.** *m*

Other voltages available to order.

HD-230

HEATER, INFRARED, for the rapid drying of small quantities of material, evaporation where splashing must be avoided, as in isotope work, or the application of local heat to an assembly such as a fractional distillation column. The sample temperature may be controlled by adjusting the distance from the lamp to the material.

The heater comprises a 250W infrared lamp, with built-in silvered reflector, mounted in an ES lampholder carried on a 20 cm long, 12·5 mm dia. tube which may be fixed into a standard bosshead. The 3-core connecting cable is taken through the centre of the tube.

HD-262

HEATER, infrared, as specification, without stand or bosshead.

For 200/250V supplies	Each	**£3. 4. 0.**	*m*
For 110/120V supplies	Each	**£3. 4. 0.**	*m*

REPLACEMENT PART

HD-265 **Lamp bulb, infrared, 250W.**

For 200/250V supplies	Each	**£1. 6. 2.**	*m*
For 110/120V supplies	Each	**£1. 6. 2.**	*m*

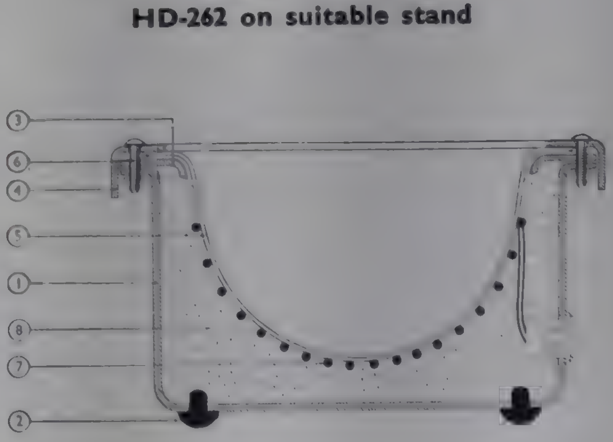
When ordering please state voltage.

HD-262 on suitable stand

HEATING MANTLES

CONSTRUCTION

Two types of heating mantle are offered, one being a series of mantles mounted inside a metal container (series M, MY, MR and MV), and the other having an elastic neck entry (series MG). The normal maximum working temperature is 450°C. The mantles are sufficiently flexible to fit snugly round vessels of the same nominal size but with varying diameters. Heating elements are designed to operate at a low temperature, thus greatly reducing fire risk in the event of breakage. Mantles with higher loading for fast distillation or for increased rates of heating are available. A cross-sectional drawing of a type M mantle for flask heating is shown. The cylindrical aluminium housing (1) supported by rubber feet (2) holds the inner fabric-supporting ring (3). The outer ring (4) clamps the knitted glass fabric (5) and the bolts and nuts (6) hold this fabric firmly in position. Coiled to the outside of the fabric is the spiral heating element (7) which is surrounded by a number of layers of glass insulation (8) minimising loss of heat. The construction of mantles for other purposes is on exactly the same lines. All mantles are supplied with full instructions for use. Element replacements for all mantles, except the MG series, are available.



CONTROLS

Satisfactory temperature control may be obtained by using energy regulators, Variac transformers or rheostats, details of which appear under **ELECTRICAL CONTROLS.**

All items on this page normally available from stock.

HD-500

HD-505

HD-500

HEATING MANTLES, *Electrothermal,* **Series M,** for flasks, as specification, in metal container with wide rim. A thermocouple is incorporated in mantles of 1 litre or more, and the larger sizes, from 5 litres, with more than one circuit, have an indicator lamp for each circuit which can be controlled separately. All mantles are supplied with a plug and socket for connection to the mains. For 200/250V supplies.

For sizes and prices see table below.

HD-505

HEATING MANTLES, *Electrothermal,* **Series MY,** similar to the HD-500 series, but in economy frame without built-in thermocouple or indicator lamp. A bracket for mounting a support rod is fitted at the rear. Supplied with 3 ft of 3-core cable connected directly to the element for mains connection. For 200/250V supplies.

For sizes and prices see table below.

REPLACEMENT PART

HD-510	**Element, for mantles HD-500 and HD-505, see table below.**	

ACCESSORIES

HD-550	**Pyrometer, bench stand type, with compensating leads. scale 0 to 500°C** ... ... **Each £10. 0. 0.**	*f*
EC-810	*et seq.* **Control units** ...	For details and prices see entries in List No. sequence.
ED-600	*et seq.* **Variable transformers**	
ED-320	*et seq.* **Rheostats**	
SM-540	**Support rods, duralumin, to fit support brackets on mantles HD-505**	
SM-600	**Clamp,** *Technico*	
SM-610	**Bosshead,** *Technico*	

Flask capacity	Loading Watts	Mantles for 200/250V supplies		**HD-510** Elements for HD-500 and HD-505 Each
		HD-500 Each	**HD-505** Each	
50 ml	60	**£6. 10. 0.** *m*	**£4. 15. 0.** *m*	**£3. 3. 0.** *m*
100 ,,	60	**£7. 3. 0.** *m*	**£5. 5. 0.** *m*	**£3. 8. 0.** *m*
250 ,,	150	**£7. 15. 0.** *m*	**£6. 4. 0.** *m*	**£4. 1. 0.** *m*
500 ,,	200	**£9. 3. 0.** *m*	**£6. 16. 0.** *m*	**£4. 9. 0.** *m*
1 litre	300	**†£10. 13. 0.** *m*	**£7. 14. 0.** *m*	**£5. 5. 0.** *m*
2 ,,	450	**†£12. 15. 0.** *m*	**£9. 4. 0.** *m*	**£6. 1. 0.** *m*
3 ,,	500	**†£15. 15. 0.** *m*	**£11. 8. 0.** *m*	**£7. 12. 0.** *m*
5 ,,	800	**†£20. 10. 0.** *m*	**£14. 16. 0.** *m*	**£9. 15. 0.** *m*
10 ,,	1000	**†£25. 10. 0.** *mN*	**£19. 8. 0.** *mN*	**£12. 7. 0.** *mN*
20 ,,	1500	**†£34. 0. 0.** *mN*	—	**£16. 13. 0.** *mN*

† Fitted with thermocouple.

Larger sizes of mantles are available. Details on application.

Items on this page normally available from stock except those coded *N*.

SEMI-MICRO HEATING MANTLES

These mantles have been designed for heating of semi-micro flasks, the flexible knitted heating element being suitable for pear shape or round bottom flasks from 10–50 ml. Average flask contents can be heated to 100°C in 4–8 mins. Two models are available, one having a built-in controller and support rod, both having a loading of approx. 60W on 200/250V a.c./d.c. supplies.

HD-570

SEMI-MICROMANTLE, *Electrothermal*, **Series MR,** in circular aluminium housing, for use with separate controller, complete with 3-core connecting cable. For 200/250V supplies ... ... Each **£5. 0. 0.** *m*

HD-575

SEMI-MICROMANTLE, *Electrothermal*, **Series MR,** in rectangular aluminium housing with support rod and built-in controller on inclined panel. For 200/250V supplies ... ... Each **£9. 6. 0.** *m*

NOTE: The hole in the support rod will accept clamps SM-670, SM-680, SM-682 or SM-685, etc.

Electrothermal
CAT. No.
ml.
SER.No.
WATTS
VOLTS
MAX. TEMP.
MADE IN ENGLAND

HD-570

FLEXIBLE HEATING MANTLES

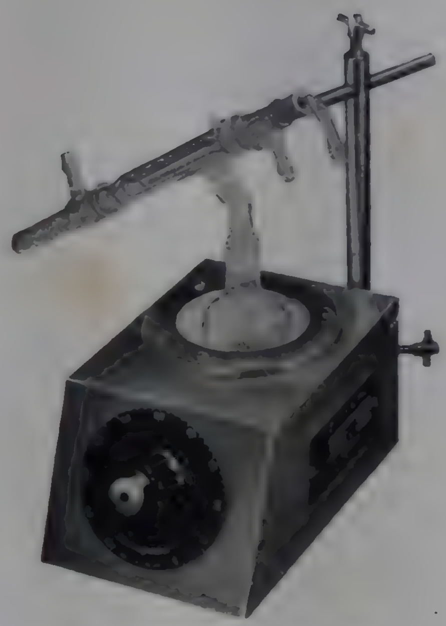
HD-604

HEATING MANTLES, earthed flexible, *Electrothermal*, **Series MG** with earthed casing and elastic neck entry.

Designed to meet the need for a light and flexible flask heater with element temperatures up to 450°C. The metal housing provides good earth protection, a stable base so that the mantle can either stand on the bench or be suspended on a flask and also acts as a safety reservoir in case of flask breakage.

The elastic nature of the knitted glass fabric enables flat or round bottom flasks and flasks of wide tolerance to be used with the same mantle. The intimate contact obtained provides efficient heat transfer and reduces heat losses to a minimum.

Connections to the elements are made by 3-core cable. For 200/250V supplies. For sizes and prices see table below.



HD-575 illustrated with SM-680 and DT-750

Flask capacity	Loading Watts	Each	
50 ml	60	£4. 10. 0.	*m*
100 ,,	60	£5. 0. 0.	*m*
250 ,,	150	£5. 8. 0.	*m*
500 ,,	200	£6. 0. 0.	*m*
1 litre	300	£7. 4. 0.	*m*
2 ,,	450	£8. 14. 0.	*m*
3 ,,	500	£10. 8. 0.	*m*
5 ,,	800	£13. 5. 0.	*m*

HD-604

SPARE ELEMENTS cannot be supplied for the above mantles. The element is attached to the main glass fabric and repairs are not possible in the event of failure.

CONTROL ACCESSORIES
Suitable control units see EC-810 et seq.
Suitable variable transformers see ED-600 et seq.
Suitable rheostats see ED-320 et seq.

All items on this page normally available from stock.

HD-654

MULTIMANTLES, *Electrothermal*, Series MV.

Multimantles are designed to accommodate a large variety of flasks and funnels of different sizes. They are intended for use in small laboratories with limited resources, but are not recommended for standard application, where a heating mantle of the correct size is to be preferred. The multimantle is designed on the same principle as HD-500 etc., but the shape of the knitted fabric allows such elasticity and flexibility that it shapes itself snugly to an infinite variety of vessels. An opening in the base enables funnels or vessels with a bottom drain-off to be heated as efficiently as round or flat bottomed flasks. A support rod may be fitted into the two-way socket either vertically or horizontally, ensuring a firm support for small vessels or the multimantle itself in any position. The mantle operates at temperatures up to 450°C with full or empty flasks. A switch is fitted on all models with two elements so that the upper circuit may be switched off when heating small vessels. For 200/250V supplies.

For sizes and prices see table below.

CONTROL ACCESSORIES for models without built-in regulator.

Suitable control units see EC-810 et seq.

Suitable variable transformers see ED-600 et seq.

Suitable rheostats see ED-320 et seq.

Multimantles									Replacement elements		
List No.	Flask capacity	Mains supply	Support rods	Built-in controls		Loading Watts	Each		List No.	Each	
				Switch	Energy regulator						
HD-650	50 to 500 ml	a.c./d.c.	1	—	—	300	£8. 15. 0.	*mS*	**HD-670**	£4. 4. 0.	*mS*
HD-652	50 to 2000 ml	a.c./d.c.	1	1	—	450	£12. 15. 0.	*mS*	**HD-672**	£6. 2. 0.	*mS*
HD-654	50 to 2000 ml	a.c. only	1	1	1	450	£15. 0. 0.	*mS*			
HD-658	0·5 to 6 litres	a.c. only	3	1	1	800	£25. 10. 0.	*mS*	**HD-676**	£11. 0. 0.	*mS*
HD-662	2 to 12 litres	a.c. only	3	1	1	1000	£37. 10. 0.	*m*	**HD-680**	£14. 14. 0.	*m*
HD-666	5 to 22 litres	a.c. only	3	2	1	1500	£45. 0. 0.	*m*	**HD-684**	£18. 13. 0.	*m*

HEATING MANTLES, *Electrothermal*, Series MB, for squat form beakers, in metal containers, for 200/250V supplies.

List No.	Beaker capacity	Loading Watts	Each	
HD-752	100 ml	60	**£7. 18. 0.**	*m*
HD-754	250 ml	150	**£8. 10. 0.**	*m*
HD-758	600 ml	200	**£9. 10. 0.**	*m*
HD-760	1000 ml	300	**£13. 10. 0.**	*m*

HD-752 to HD-760

HD-852 to HD-858

HEATING MANTLES, *Electrothermal*, Series MD, for 60° funnels, with metal rim at top, elastic aperture for stem of funnel and support rod. For 200/250V supplies.

List No.	Funnel dia.	Loading Watts	Each	
HD-852	50 mm	60	**£7. 3. 0.**	*m*
HD-854	75 mm	60	**£7. 18. 0.**	*m*
HD-856	100 mm	200	**£9. 5. 0.**	*m*
HD-858	125 mm	300	**£11. 0. 0.**	*m*

Items on this page coded S normally available from stock.

HEATING TAPES AND CORDS

Electrothermal flexible heating tapes provide a source of supplementary heat on fractionating columns and distillation processes to prevent solidification or condensation of high boiling point substances. They are ideal for applying heat to pipes, tubes and vessels of non-standard shapes and sizes when it is not practical to use normal heating mantles or heating jackets.

HE-100 to HE-115

HEATING TAPE (Heat-by-the-yard), *Electrothermal*, Series HT.

This flexible and elastic tape is invaluable for the simple and efficient heating of complicated shapes, since it can be cut to the required length and insulated terminals fitted. It consists of a continuous network of resistance wires enclosed in a knitted elastic sleeve of glass fibre yarn. The electrical resistance is such that the normal working voltage is approximately 10V per ft length which gives a power rating of 7W/in² (1W/cm²). Temperatures up to 450°C can be achieved. Supplied with voltage/temperature Nomogram in a dispensing carton.

List No.	Length (approx.)		Width (approx.)		No. of connectors	Each	
	ft	cm	in	mm			
HE-100	25	765	0·5	12·7	6	**£16. 0. 0.**	*m*
HE-105	50	1530	0·5	12·7	12	**£29. 10. 0.**	*m*
HE-110	25	765	1	25	6	**£20. 0. 0.**	*m*
HE-115	50	1530	1	25	12	**£36. 10. 0.**	*m*

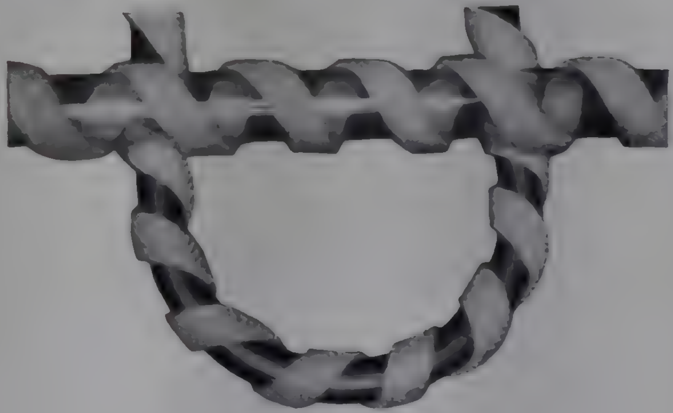
It is essential that these tapes be used with a voltage control.

CONTROL ACCESSORIES for heating tapes

Suitable control units see EC-810 et seq.
Suitable variable transformers see ED-600 et seq.

HE-130

CONNECTORS, for HE-100 to HE-115.
Box of 12 **£3. 5. 0.** *f*



HE-150 to HE-154

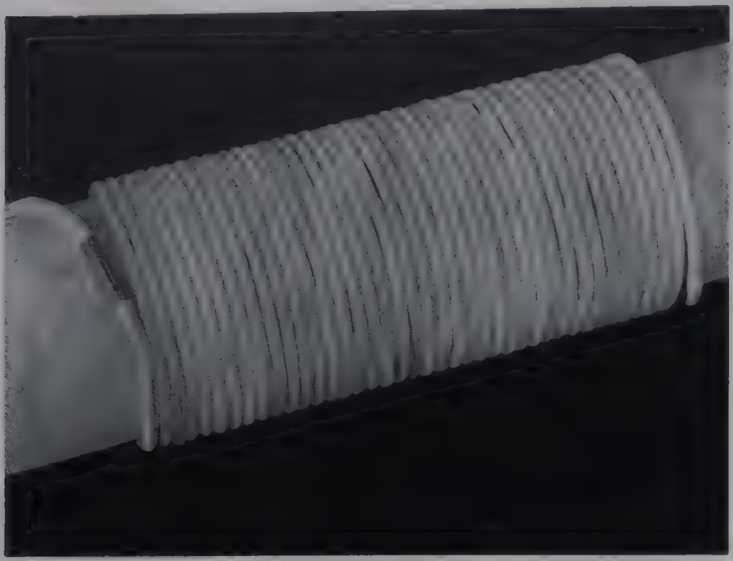
HEATING TAPES, *Electrothermal*, Series HT3.

Made of one or more fabric bands of resistance wire separated and bordered by bands of high temperature resisting glass fibre yarn. The surface loading of the heating tapes is approx. 3W/in² (0·5W/cm²) of tape, and will give temperatures of 400°C and over inside a glass tube of 2 mm wall thickness. The tapes are insulated both sides and fitted with lead-in wires terminating in a mains supply connection. Glass laces are provided at both ends to hold the tape in position. For 200/250V supplies.

List	Length (approx.)		Width (approx.)		Watts	Each	
	in	cm	in	mm			
HE-150	48	125	0·5	12·7	72	**£3. 10. 0.**	*m*
HE-152	36	90	1	25	100	**£3. 10. 0.**	*m*
HE-154	72	180	1	25	210	**£5. 10. 0.**	*m*

These tapes are available in a wide range of sizes from 24 to 96 in long and from 0·5 to 3·5 in wide. Full details on application.

All items on this page normally available from stock.



HE-250 to HE-275

HEATING CORD, *Electrothermal.*

For applications necessitating heat inputs where heating tapes cannot meet the requirements. Consists of a heating element enclosed in a tough fibre glass braided sheath approx. 5 mm diameter, available in several lengths with 2 ft inactive end connections. Designed to operate at up to 5W per linear inch; close wound, the loading is 26W/in² (4W/cm²). Can be used to produce very localised heating for vapour tubes for example, or irregular shapes irrespective of size or material. **It is essential to use a control unit with these heaters.** Temperatures up to 450°C can be achieved. For 200/250V supplies.

List No.	Length		Loading W at 230V	Each	
	ft	cm			
HE-250	1	30·5	60	£2. 3. 0.	*m*
HE-255	2	61·0	120	£2. 11. 0.	*m*
HE-260	4	122·0	240	£3. 16. 0.	*m*
HE-265	8	244·0	480	£6. 7. 0.	*m*
HE-270	16	488·0	960	£9. 7. 0.	*m*
HE-275	32	976·0	1,920	£14. 5. 0.	*m*

CONTROL ACCESSORIES

Suitable control units see EC-810 et seq.

Suitable variable transformers see ED-600 et seq

HE-400

HEATER, BUNSEN, *Electrothermal.*

This heating apparatus combines the advantages of a gas burner with cleanliness in operation and ease of control associated with electrical heating. The radiation of the heater is directed upwards only, and it can be used for heating test tubes, crucibles, small beakers or flasks. Used inverted, it can provide the source of heat for evaporations. The apparatus is made of corrosion resistant metal, and consists of a heating element embedded in refractory material mounted in the top of a vertical tube which forms the supporting case. This tube is provided with air circulating holes in the lower part and a gap between the element and the casing prevents any undue temperature rise. The heater stands on rubber feet and can be held in the hand. A removable cowl fitted to the top deflects heat radiation from the hand. The overall height is 18 cm and the element, rated at 300W, gives a temperature range from 800° to 1000°C.

HE-400

HEATER, BUNSEN, *Electrothermal,* as specification, for a.c. or d.c. supplies.

For 230/250V	Each	**£8. 15. 0.**	*m*
For 200/220V	Each	**£8. 15. 0.**	*mN*
For 100/130V	Each	**£8. 15. 0.**	*mN*

REPLACEMENT PART

HE-410	**Heating element**	Each	£3. 5. 0.	*m*

CONTROL ACCESSORIES

Suitable control units see EC-810 et seq.

Suitable variable transformers see ED-600 et seq.

Compenstat

(Patent No. 882,942)

A precision hydraulic 'set and forget' thermostat designed to satisfy the exacting standards of temperature control for *Gallenkamp* ovens, incubators, water baths and autoclaves. Features include:

1. **Direct reading scale.**
2. **Rapid and easy servicing.**
3. **Automatic compensation** for variations in ambient and control head temperature.
4. Capillary heater feed back system providing a form of **proportional control** which prevents overshoot and reduces fluctuation to a minimum.

For full details and price see TM-500 in List No. sequence.

Items on this page normally available from stock except those coded *N*.

HEATING APPARATUS
see
•FURNACES • HOTPLATES
•INCUBATORS • OVENS

Gallenkamp
ovens
incubators

SECTION INDEX

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Catalogue headings under which apparatus of histological interest is also included: Dissecting Instruments; Jars; Microscopes; Microtomes; Plates; Refrigeration (Freezer aerosol); Tubes.

HJ-025

HJ-025

WAX HEATER, electrically heated, contains about 250 ml molten wax. It consists of a conical shaped aluminium vessel fitted with two 60W heating elements, each controlled by a switch. A central plunger operated from a conveniently placed lever seals the outlet, or controls the flow of wax. The heater is supplied with a separate stand and drip tray. The heater requires but does not include a controller for adjusting the temperature of the wax. For 200/250V a.c. or d.c. supplies.
Each **£13. 0. 0.** *m*

ACCESSORY

EC-810 **Controller,** for in-line connection. { For details see entry in List No. sequence.

Gallenkamp WAX EMBEDDING BATH

This electrically heated and thermostatically controlled wax embedding bath is suitable for most routine specimen preparations.

HJ-040

CONSTRUCTION

The stainless steel bath is mounted in a rust-proofed steel outer case and the interspace is packed with efficient slab insulation. The top of the bath is covered by a stainless steel cover which is recessed into the bath so that any spilt wax is prevented from running over the bench. Six plated spun copper pots approximately 6·3 cm dia. × 6·3 cm deep are supported by the cover. A larger pot approximately 12 cm dia. × 11 cm deep fits into the cover and may be used for storing paraffin wax. Four glass tubes of 2·5 cm dia. × 5 cm deep are provided for use with small size specimens. Overall dimensions 50 × 35 × 20 cm. The bath is uniformly heated by a 500W sheathed immersion element controlled by a *Compenstat* hydraulic thermostat to within ±0·2°C. The *Compenstat* which is fitted with a direct setting scale 0 to 100°C is mounted in a separate compartment at one end of the bath together with a mains switch and pilot lamp.

HJ-040

BATH, WAX EMBEDDING, *Gallenkamp*, as specification. Comprising water bath WF-400 and stainless steel cover complete with one large and six small pots and four glass tubes. For a.c. single phase supplies.

For 220/240V ...	Each	**£92. 10. 0.**	*b*
For 200/210V ...	Each	**£92. 10. 0.**	*bN*
For 110/120V ...	Each	**£92. 10. 0.**	*bN*

When ordering please state voltage.

REPLACEMENT PART

TW-600 **Tubes,** 50 × 25 mm. For price see entry in List No. sequence

Items on this page normally available from stock except those coded *N*.

Gallenkamp WAX EMBEDDING OVEN

- **Efficient impregnation**
- **Large embedding pots**
- **Large storage space**
- **Electrically heated**
- **Thermostatically controlled**

This specially designed oven, comprising an anhydric wax embedding bath and a large capacity storage space. is particularly suitable for routine large scale impregnations.

EMBEDDING BATH

The embedding bath taking twelve embedding pots, is above the storage space and is protected from dust, etc., by a single cover which opens backwards and is fitted with retaining stays and lifting handle. The pots are plated copper spinnings of large dimensions, 7·5 × 4·4 cm deep, with handles and loose covers. The size of the pots permit large specimens to be treated and ensures efficient impregnation at all times. A draining tray extends completely beneath the pots to catch any accidentally spilt wax which may be removed periodically via a drain-cock at the lowest point of the tray. The shelf supporting the pots has turned-up edges ensuring that all spilt wax will fall onto the tray. This prevents the embedding section from flooding with wax and also maintains a clean external oven surface.

STORAGE OVEN

The lower part of the oven is fitted with a door and a perforated shelf for drying slides.

The large storage space, 33 × 46 × 43 cm high, can also be used to store the paraffin wax. Thus a convenient supply of melted wax may be maintained in close proximity to the embedding pots. The oven may be used also for embedding whole specimens in large diameter glass jars.

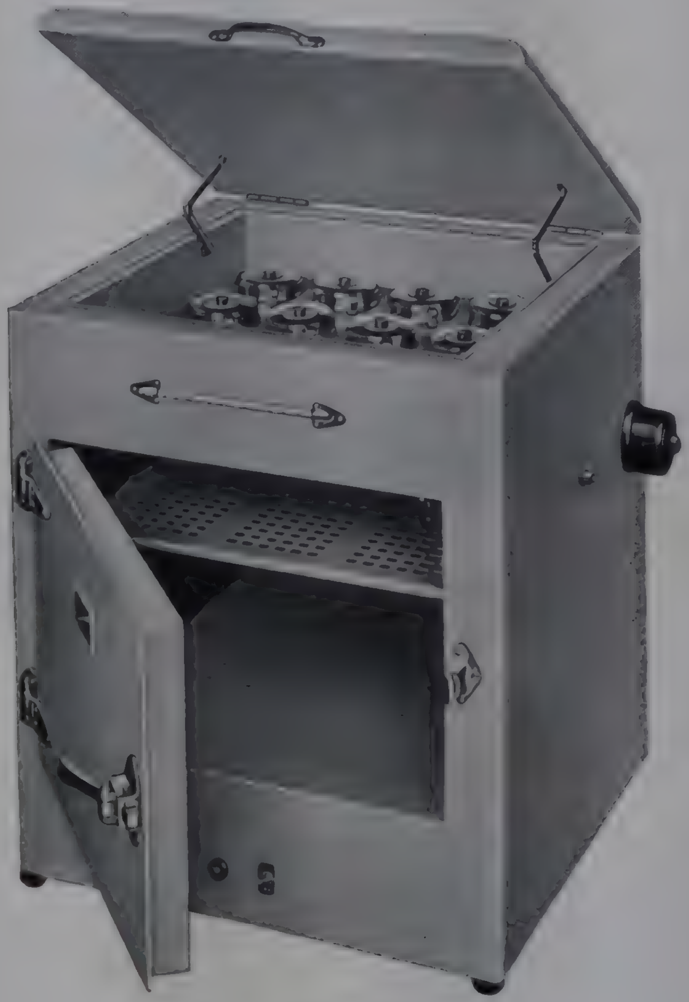
HEATING

Heating is by means of mica-base elements fixed on the bottom and two sides of the oven liner. Total loading is 500W. The temperature is controlled to within ±1°C by the Sunvic thermostat fitted through the side of the oven. A pilot lamp fitted below the oven door indicates the operation of the thermostat and a 'mains-on' pilot lamp is also provided. The temperatures are indicated by a built-in angle thermometer in the embedding section. A thermometer may be inserted through a tubulure in the storage section.

CONSTRUCTION

The oven is of modern design, constructed of welded steel and finished in grey duotone stoved enamel. The aluminium sheet liner is lagged with glass fibre and fitted with a shelf. Both doors are fully lagged and the oven door is hung on heavy duty hinges and fitted with a roller bolt catch.

	H	W	D
Overall dimensions	66 ×	57 ×	53 cm



HJ-100

HJ-100

OVEN, WAX EMBEDDING, *Gallenkamp*, electrically heated, as specification. With twelve embedding pots and fitted angle thermometer. For a.c. single phase supplies.

For 220/240V	Each	**£253.10. 0.**	*b*
For 200/210V	Each	**£253.10. 0.**	*bN*
For 110/120V	Each	**£253.10. 0.**	*bN*

When ordering please state voltage.

REPLACEMENT PARTS

HJ-105	**Pots, embedding,** plated copper, with covers.	Each	**£1. 17. 0.**	*b*
HJ-108	**Thermometer,** angle, solid stem, scale span 0–110°C in 1°C	Each	**£1. 16. 0.**	*c*

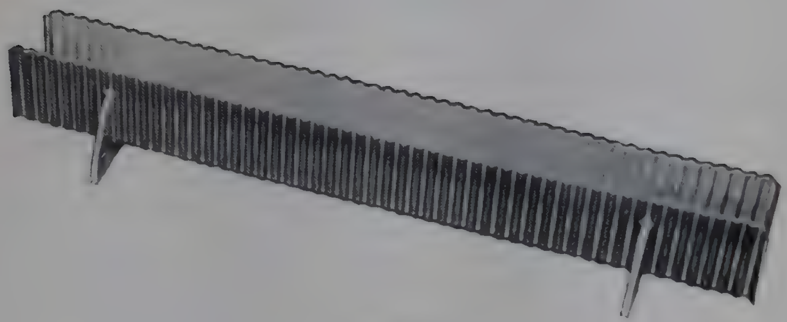
ACCESSORY

TJ-320 **Thermometer,** scale span —5 to 105°C in 1°C, for fitting in thermometer tubulure. For price see entry in List No. sequence.

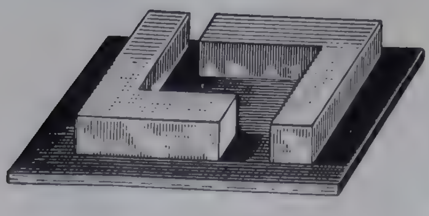
Suitable **stainless steel jug** for paraffin wax see JV-150. Suitable **stainless steel funnel** for use with paraffin wax see FP-370.

Items on this page normally available from stock except those coded *N*.

HJ-200


HJ-210

HJ-230


HJ-260

PARAFFIN SECTION MOUNTING BATH

This bath has been specially designed for histological work and the large internal diameter of 20 cm, makes it suitable for whole brain sections. The 450W heating element, carried on elastic glass fabric, extends over the whole outer surface of the water container so ensuring efficient heat transfer and uniform heating. The black matt interior finish enables the sections to be seen clearly. The aluminium case is efficiently lagged and fitted with rubber feet. Dimensions, inside depth 7·5 cm, outside dia. 32·5 cm, outside depth 16 cm. With black anodised aluminium dust cover. A slide drying rack to take 50 slides is available as an accessory.

HJ-200
PARAFFIN SECTION MOUNTING WATER BATH, *Electrothermal*, as specification, fitted with built-in energy regulator to adjust temperature, for 200/250V a.c. supplies ... ... Each **£25. 0. 0.** *m*

HJ-202
PARAFFIN SECTION MOUNTING WATER BATH, *Electrothermal*, as specification, fitted with built-in thermostat to control temperature between 40° and 80°C, for 200/250V a.c. supplies ... Each **£31.10. 0.** *m*

ACCESSORY

HJ-210 **Slide drying rack,** aluminium, for use with above baths. To take 50 slides ... ... Each **£1.12. 0.** *m*

Also available for other voltage ranges to order.

VACUUM EMBEDDING BATHS

The single pan model consists of a removable tinned copper pan suspended in an electrically heated water bath, all mounted in an outer steel case. A plate glass cover with rubber washer seals the top of the pan, and a needle valve mounted in the cover provides a means of evacuating the pan. The needle valve outlet is suitable for connecting to 8 mm bore flexible vacuum tubing. A hydraulic thermostat with control knob scaled 70 to 100 arbitrary units, controls the water bath temperature up to 82°C, and a tubulure is provided for insertion of a mercury in glass thermometer.
The double pan model is as above but has two pans mounted side by side in the water bath. Each pan cover is fitted with a needle valve.

HJ-230
BATH, VACUUM EMBEDDING, as specification, with **single pan** 16·5 cm diameter by 15·0 cm deep. Complete with mains and thermostat indicator lamps, but without thermometer. For 230/250V 50 Hz single phase supplies. Loading 250W. Overall dimensions 30×30×28 cm. Weight 8·5 kg ... ... Each **£28. 0. 0.** *fN*

HJ-235
BATH, VACUUM EMBEDDING, as specification, with **double pan** each 16·5 cm diameter by 15·0 cm deep. Complete with mains and thermostat indicator lamps, but without thermometer. For 230/250V 50 Hz single phase supplies. Loading 500W. Overall dimensions 56×30×28 cm. Weight 17 kg.
Each **£48. 0. 0.** *fN*

REPLACEMENT PARTS

HJ-237 **Sealing washer,** for above baths ... Each **£0.10. 0.** *fN*
HJ-239 **Glass cover,** with hole 9·5 mm diameter but without needle valve ... ... Each **£1. 5. 0.** *fN*

HJ-260
FRAMES, EMBEDDING, for wax section moulds, comprising two L-shaped pieces of brass with a flat base plate.

Internal dimensions	5×3	5·5×4 cm	
Set	£0.12. 6.	£0.15. 0.	c

Items on this page normally available from stock except those coded *N*.

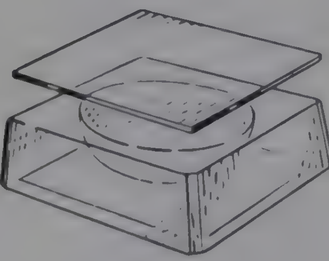
STAINING ACCESSORIES

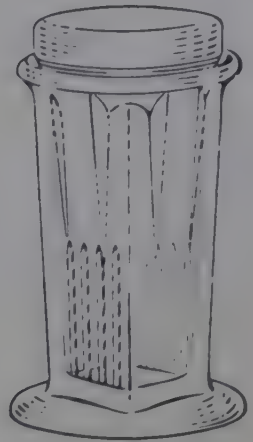
***HJ-300**

STAINING BLOCK, glass, with cavity 30 mm dia. 10 mm deep. Complete with flat glass cover 37 mm square to minimise evaporation.
Dozen **£1.18. 0.** Each **£0. 4. 7.** *c*

HJ-320

STAINING JAR, Coplin, borosilicate glass, with loose fitting cover, to take ten microscope slides, 75×25 mm, in pairs back to back.
Gross **£41. 0. 0.** Dozen **£3.16. 0.** *d*
Each **£0. 7. 6.**


HJ-300

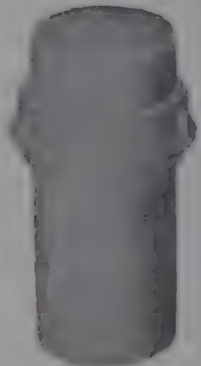

HJ-320

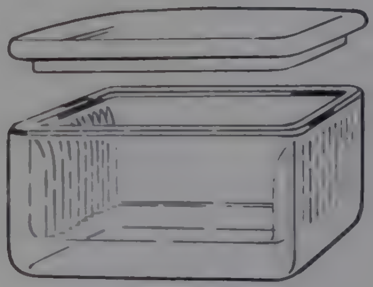
HJ-330

STAINING JAR, Wilson, polythene, with screw-on lid giving liquid tight seal and taking ten microscope slides, 75×25 mm, back to back. Particularly suitable for staining blood smears and for use with stains in volatile solvents ... Dozen **£2. 15. 0.** Each **£0. 5.10.** *m*

HJ-350

STAINING TROUGH, borosilicate glass, with loose fitting cover, to take twenty microscope slides, 75×25 mm, back to back ... Gross **£49. 0. 0.** Dozen **£4.10. 0.** *d*
Each **£0. 8. 6.**


HJ-330


HJ-350

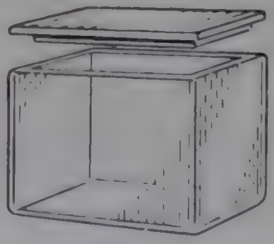
***HJ-390**

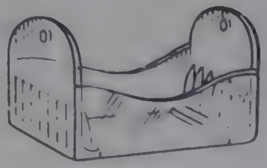
STAINING TROUGH, stout glass, with loose fitting cover. To take grooved tray HJ-400. Dimensions 83×103×72 mm high.
Dozen **£14.15. 0.** Each **£1. 7. 0.** *m*

***HJ-400**

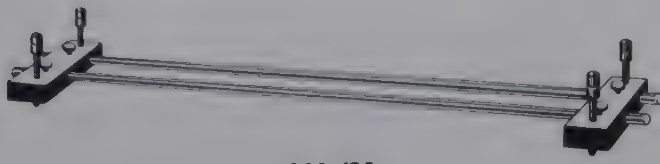
STAINING TRAY, stout glass, with ten grooves to take twenty microscope slides, 75×25 mm, back to back, and fitting into staining trough HJ-390. Eminently suitable for batch staining procedure, where sections can be dehydrated and stained in succession without any handling of slides.
Dozen **£11. 0. 0.** Each **£1. 0. 0.** *m*

HJ-402 **Wire handle,** for lifting tray HJ-400 into and out of trough HJ-390. Dozen **£0.14. 0.** Each **£0. 2 10.** *b*

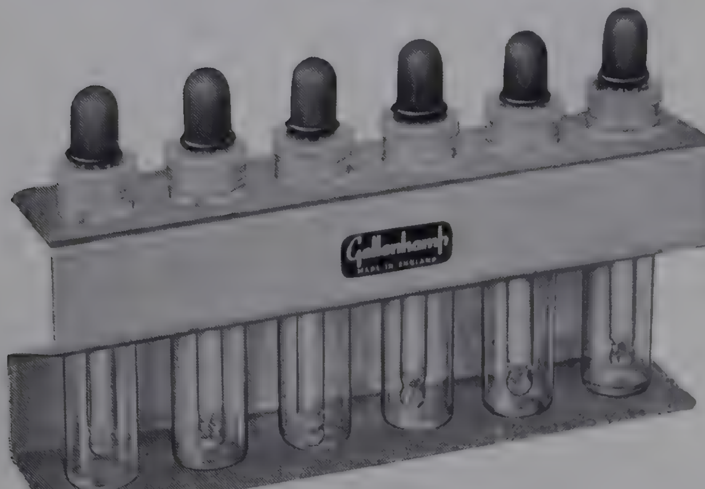

HJ-390


HJ-400

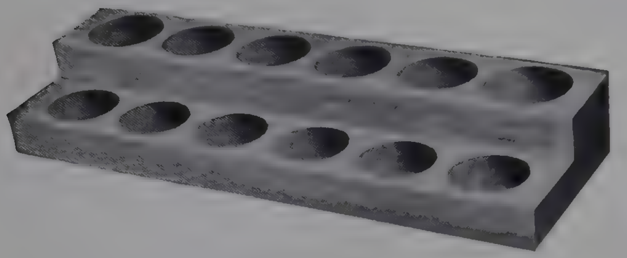
All items on this page normally available from stock.



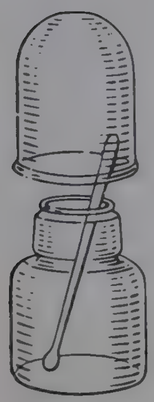
HJ-420



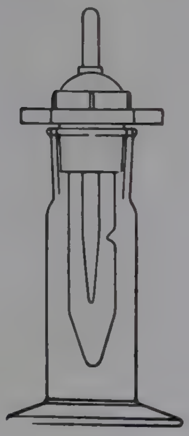
HJ-425



HJ-450



HJ-500



HJ-515

HJ-550

HJ-420

STAINING RACK, *Gallenkamp*, for use over laboratory sinks. Comprises two brass blocks drilled to take two glass rods to span sink and carry microscope slides. Each block has milled head screws for clamping glass rod and levelling screws for gently rocking staining fluid or sections. Without glass rods ... Pair **£1. 11. 0.** *b*

We shall be pleased to supply the rack complete with 6–7 mm dia. glass rods at a small extra charge. Please specify length required.

HJ-425

STAINING RACK, comprising stainless steel stand and 6×15 ml glass tubes with dropping pipettes.
Each **£1. 14. 0.** *c*

REPLACEMENT PART

HJ-428 **Tube,** 15 ml, glass with dropping pipette.
Set of 6 **£0. 15. 0.** *c*

HJ-450

STAINING BOTTLE STAND, polished mahogany, for twelve dropping bottles, size 30 ml.
Dozen **£11. 10. 0.** Each **£1. 1. 0.** *c*

Suitable **dropping bottles** for stains see BT-550 *et seq.* in List No. sequence.

Polythene trays for protecting bench tops from spilt stains, see BT-640 in List No. sequence.

Filter paper for absorbing stains from sections, see FC-550.

HJ-500

CANADA BALSAM BOTTLE, glass, with loose fitting glass cap and solid glass dropper. Capacity 30 ml.
Each **£0. 5. 0.** *m*

HJ-515

IMMERSION OIL BOTTLE, comprising two vessels, the inner of low actinic amber glass for 6 ml cedar wood oil and the outer of clear glass for 30 ml xylene. The inner vessel fits into the outer by an interchangeable plastics stopper and is fitted with an indentation for removing excess oil, a solid glass dropper and a red plastics cap ... Dozen **£10. 5. 0.** Each **£0. 18. 6.** *c*

***HJ-520**

IMMERSION OIL, a non-drying oil with refractive index $n_D^{25°C}$ 1·5150 and very low fluorescent properties. Suitable for oil immersion lenses and as a transparent mounting medium. Supplied in bottle containing 1 fl. oz (approx. 28 ml) ... ... Each **£0. 9. 6.** *c*

***HJ-550**

FORCEPS, nickel plated, with spatulate ends, for manipulating slides and cover glasses.
Dozen **£3. 0. 0.** Each **£0. 6. 4.** *m*

BRITISH STANDARDS

The British Standards Institution is the national standardising body of the U.K. The standards which it publishes represent the results of collaboration between a wide range of interests including users, technical and scientific experts and manufacturers.

The BSI maintains close contact with many overseas standardising bodies both by interchange of information and by direct representation through the medium of ISO (International Organisation for Standardisation). Many British Standards, particularly those revised in recent years reflect the influence of international requirements.

Any article made to a British Standard is one on which the purchaser or user can rely as being satisfactory for its intended general use. The BS requirements must be such as will satisfy the majority of users and manufacturers, otherwise the standard will not receive general recognition.

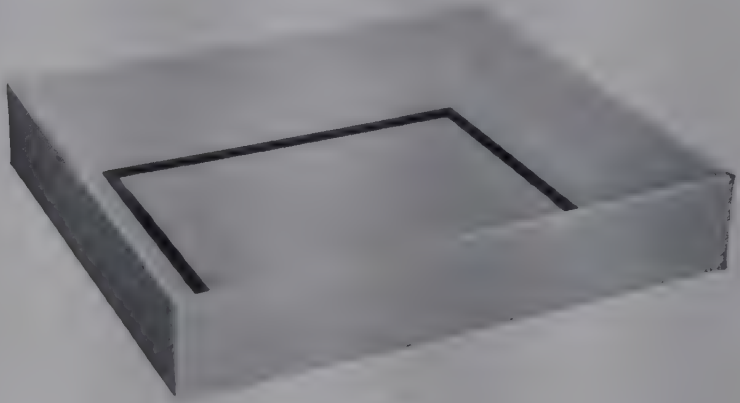
The discerning purchaser will not only require goods made to the appropriate BS but will also recognise that within the framework of a standard a variation of finish and quality is possible and that it is still as important as ever to purchase from a source with a known reputation for high quality.

The name *Gallenkamp* has been known in laboratories throughout the world for more than three quarters of a century. *Gallenkamp* products bearing one of the five registered trade marks, *Gallenkamp*, *Technico*, *Compenstat*, Ⓖ or *Asda* can be relied upon to provide the highest quality at an economic price.

All items on this page normally available from stock.

HJ-600

SLIDE WASHING TRAY, Perspex, opalescent, with raised ledge inside base against which microscope slides can be placed at an angle to facilitate treating with reagents and washing. Internal dimensions 35×30×5·5 cm ... ... Each **£2. 10. 0.** *m*



HJ-600

HJ-620

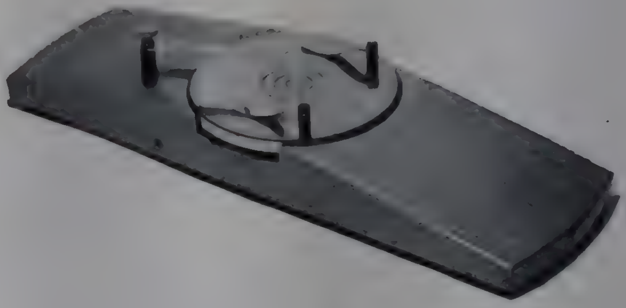
SLIDE DRYING PLATE, electrically heated, with a smooth enamelled steel top, dimensions 39·5×26·5 cm. With thermostat giving temperature control up to approximately 60°C and accurate to ±0·5°C. Power rating 150W. For 220/250V a.c. supplies. With indicator lamp and length of 3-core cable ... Each **£5. 5. 0.** *m*

Suitable **incubator** for drying microscope slides, see IH-100, size 1.

HJ-620

HJ-650

RINGING TURNTABLE, for making permanent, superior finish, microscope slide preparations with asphaltum varnish. Comprises brass table rotating on a ball bearing fitting, with hand rests on both sides and an adjustable arm for steadying the brush.
Each **£6. 0. 0.** *f*



HJ-650

MICROSCOPE SLIDES

HJ-700

SLIDES, MICROSCOPE, 75×25 mm, plain cut edges. Thickness 1·5/1·8 mm.
Ten gross **£3. 6. 0.** Gross **£0. 6. 9.** *m*

HJ-710

SLIDES, MICROSCOPE, *Chance,* 75×25 mm, edges obscured.

Thickness	0·8/1·0	1·0/1·2	1·2/1·5 mm	
Gross	**8/9**	**7/6**	**6/11**	*f*

***HJ-720**

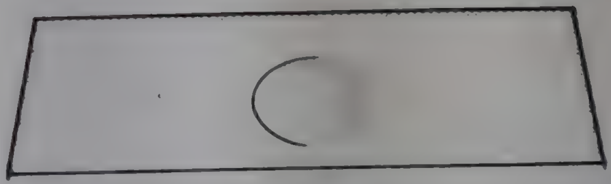
SLIDES, MICROSCOPE, 75×25 mm, edges finely ground.

Thickness	0·6/0·8	0·8/1·0	1·0/1·2	1·2/1·4 mm	
Ten gross	**175/–**	**157/6**	**152/6**	**145/–**	c
Gross	**19/–**	**17/–**	**16/6**	**15/9**	

***HJ-740**

SLIDES, MICROSCOPE, edges finely ground, for large sections. Thickness 1·2/1·5 mm.

Dimensions	75×38	75×50 mm	
Gross	**31/–**	**42/–**	c
Dozen	**4/1**	**4/11**	



HJ-750

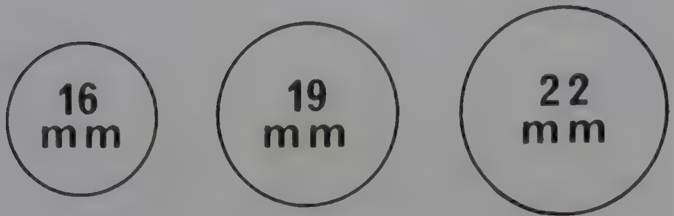
***HJ-750**

SLIDES, MICROSCOPE, 75×25 mm, edges ground and polished, with cavities for hanging drop techniques. Thickness 1·2/1·5 mm.

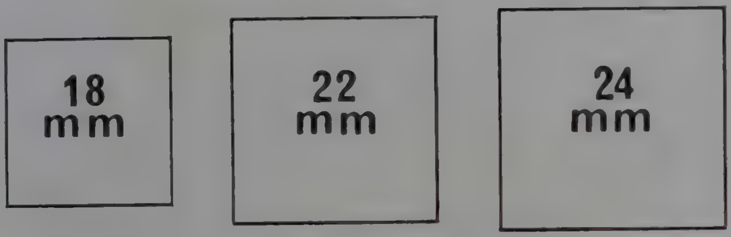
No. of cavities	1	2	
Gross	**140/–**	**235/–**	c
Dozen	**12/9**	**21/6**	

All items on this page normally available from stock.

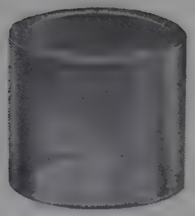
MICROSCOPE COVER GLASSES AND CELLS



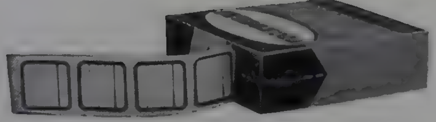
HJ-760 to HJ-762
Full size outlines



HJ-770 to HJ-772
Full size outlines



HJ-810



HJ-833

COVER GLASSES, *Chance* resistance glass, circular shape. Packed in colour coded plastics boxes of 50 marked with relevant dimensions, 20 boxes in a carton. Reduced price rates apply also to mixed orders.

List No.	Thickness No.	Thickness mm	Diam. mm	Price per box of 50 1–19	20–59	60 and over	
HJ-760	3	0·25–0·35	16	3/3	2/9	2/2	m
			19	4/–	3/4	2/8	m
			22	4/9	4/–	3/2	m
HJ-761	1½	0·16–0·19	16	2/11	2/5	1/11	m
			19	3/5	2/10	2/3	m
			22	4/–	3/4	2/8	m
HJ-762	0	0·09–0·13	13	3/–	2/6	2/–	m
			16	3/3	2/9	2/2	m
			19	4/–	3/4	2/8	m
			22	4/9	4/–	3/2	m

When ordering please state size required.

COVER GLASSES, *Chance* resistance glass, square shape. Packed in colour coded plastics boxes of 50 marked with relevant dimensions, 20 boxes in a carton. Reduced price rates apply also to mixed orders.

List No.	Thickness No.	Thickness mm	Square size mm	Price per box of 50 1–19	20–59	60 and over	
HJ-770	3	0·25–0·35	18	2/5	2/–	1/7	m
			22	3/8	3/1	2/5	m
			24	4/–	3/4	2/8	m
HJ-771	1½	0·16–0·19	18	2/2	1/10	1/5	m
			22	3/2	2/8	2/1	m
			24	3/6	2/11	2/4	m
HJ-772	0	0·09–0·13	18	2/5	2/–	1/7	m
			22	3/8	3/1	2/5	m
			24	4/–	3/4	2/8	m

When ordering please state size required.

HJ-780

COVER GLASSES, *Chance* resistance glass, rectangular shape No. 1½, 0·16–0·19 mm thick. Packed in colour coded plastics boxes of 50 marked with relevant dimensions, 20 boxes in a carton. Reduced price rates apply also to mixed orders.

Price per box of 50	Dimensions, mm 22×26	22×32	22×40	22×50	
1—19	3/6	4/8	5/9	7/6	m
20—59	2/11	3/11	4/10	6/3	m
60 and over	2/4	3/1	3/10	5/–	m

Other sizes of circular, square and rectangular cover glasses are available, prices on application.

HJ-810

GLASS RING CELLS, for mounting thick specimens such as foraminifera, insect wings, etc., on microscope slides. May also be used for observing Brownian movement.

Depth	3	5	7	9	15 mm	
Dia.	15	18	20	22	20 mm	
Dozen	**14/9**	**14/9**	**14/9**	**14/9**	**14/9**	*a*

HJ-830

LABELS, gummed paper, 22 mm square for labelling microscope slides ... ... Per 1000 **£0. 14. 0.** c

HJ-833

LABELS, self-adhesive white, 22 mm square, ruled 4 lines and black border. In dispensing carton containing 500 labels ... ... Carton **£0. 11. 3.** c

For other types of labels see **LABELS.**

Pencils for writing on glass microscope slides see PC-910 and PC-940 in List No. sequence.

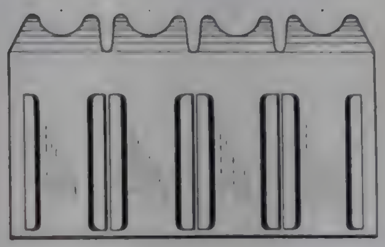
All items on this page normally available from stock.

MICROSCOPE SLIDE STORAGE

HJ-850

MICROSCOPE SLIDE HOLDER, *Gallenkamp*, aluminium, to take four slides, 75×25 mm. This holder is designed for storing microscopical preparations in storage cabinet HJ-860 or other standard filing cabinet for 125×75 mm cards. Supplied in pack of 25.

Dozen packs **£9.15. 0.** Pack of 25 **£0.17. 6.** *b*



HJ-850

HJ-902

HJ-860

MICROSCOPE SLIDE CABINET, all metal construction, with two drawers, side-by-side, sliding on polythene runners, each drawer taking 100 aluminium slide holders HJ-850. Total accommodation 800 75×25 mm slides. Designed to stack one on another, each cabinet is fitted with 4 rubber feet and a set of nuts and bolts for fixing. Dimensions 14×35×40 cm. With 200 slide holders HJ-850... ... ... Each **£14. 5. 0.** c

HJ-860

HJ-902

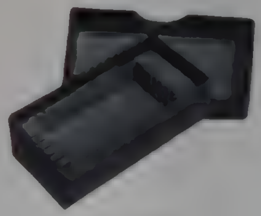
MICROSCOPE SLIDE FOLDER, with hinged flaps, numbered positions, to hold twenty 75×25 mm slides.

Dozen **£2.17. 0.** Each **£0. 6. 0.** c

HJ-910

MICROSCOPE SLIDE BOXES, pasteboard. Suitable for sending 75×25 mm slides by post.

To hold	6	12 slides	
Dozen	**25/6**	**32/–**	c
Each	**3/8**	**4/2**	



HJ-910

HJ-920

HJ-920

MICROSCOPE SLIDE BOX, covered imitation leather, with hinged lid and metal clasps. Two compartments to take a total of 100 75×25 mm slides.

Dozen **£9. 0. 0.** Each **£0.16. 6.** c

HJ-930

MICROSCOPE SLIDE CABINET, cardboard, covered imitation leather. With drop front and 12 loose trays each holding nine 75×25 mm slides providing accommodation for 108 slides.

Dozen **£9. 0. 0.** Each **£0.16. 6.** c

HJ-950

MICROSCOPE SLIDE CABINETS, all metal construction. With drawers, 3·3×29×41 cm deep divided into three compartments by fixed slotted divisions. Each drawer is fitted with a bar type handle and accommodates 300 75×25 mm slides.

No. of drawers	7	21	
To hold	2100	6300 slides	
Overall height	31	100 cm	
Each	**£11.11. 0.**	**£31. 2. 0.**	*m*

HJ-930

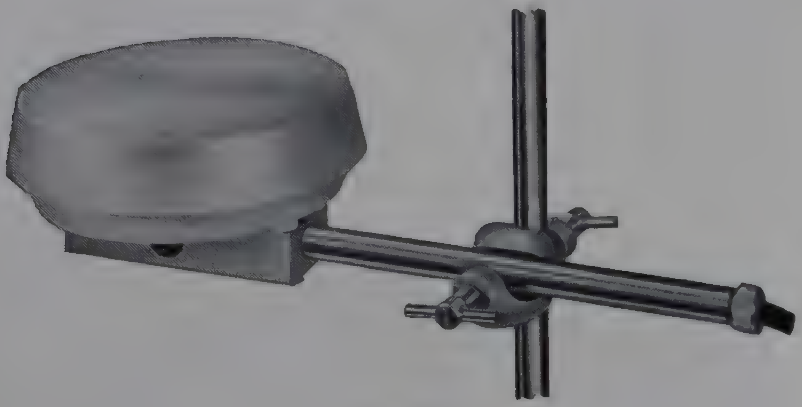
HJ-950

All items on this page normally available from stock.

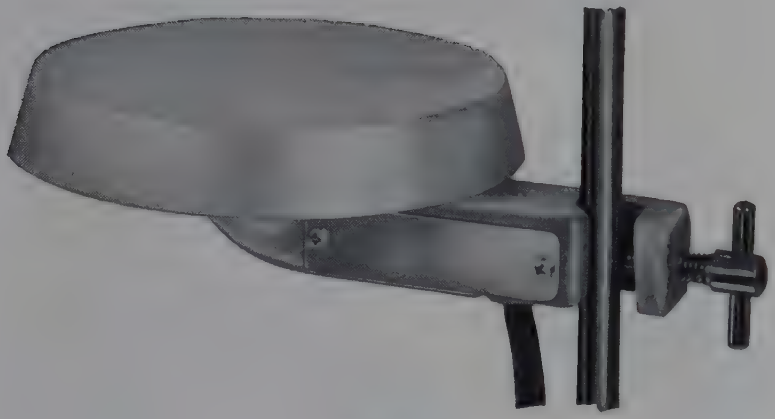
Gallenkamp LABORATORY

LABORATORY HOTPLATES of modern design and made in our own factory from highest quality materials and components. All plates (except those used with stirrer combinations) are of cast iron, machined flat and aluminium sprayed to resist corrosion.

PURPOSE-BUILT HEATING ELEMENTS are utilised to ensure maximum temperature uniformity over the whole of the working surfaces. Bench mounting hotplates are adequately insulated to avoid damage to bench tops as the result of overheating.



HL-010



HL-025

HOTPLATES, *Gallenkamp*, **circular, for retort stand mounting,** supplied with mains lead. For 220/240V a.c. supplies.
Weight 2·4 kg.

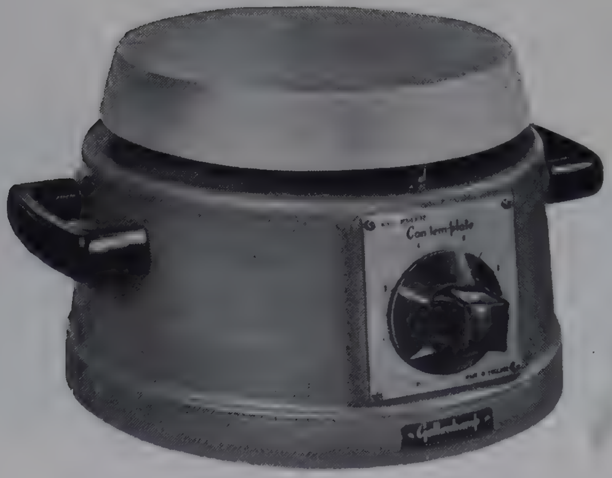
List No.	Diameter cm	°C Max.	Power rating W	Each	
HL-010	12·5	350	400	**£5. 10. 0.**	*b*
HL-025	15	550	750	**£8. 5. 0.**	*b*

Available for other voltages to order.

Suitable **POWER REGULATORS** for in-line control see EC-810 *et seq.* under ELECTRICAL CONTROLS.

REPLACEMENT PARTS

HL-016	**Element 400W, for HL-010 ...**	Each	**£1. 0. 0.**	*c*
HL-026	**Element, 750W, for HL-025 ...**	Each	**£1. 6. 6.**	*c*



HL-044

HOTPLATES, *Gallenkamp*, **circular, for bench mounting,** supplied with mains lead. For 220/240V a.c. supplies.
Diameter 15 cm. Power rating 750 W. Weight. 2·4 kg.

List No.	Control	°C Max.	Each	
HL-040	Energy regulator	550	**£15. 10. 0.**	*b*
HL-044	Thermostat	300	**£17. 0. 0.**	*b*

Available for other voltages to order.

REPLACEMENT PART

HL-046 **Element, 750W, for HL-040 and HL-044.** Each **£3. 0. 0.** *c*

All items on this page normally available from stock.

HOTPLATES

ENERGY REGULATOR MODELS have arbitrary scales of 100 divisions. These regulators control the power input, and consequently the hotplate temperature, by periodically switching on and off the electrical supply. For details see 'POWER CONTROLLERS' under 'Electrical Controls'.

THERMOSTAT MODELS utilise reliable hydraulic thermostats with direct reading temperature scales. Surface temperature fluctuations in these models is as little as 5°C. Both types of model respond rapidly to changes of control settings.

HOTPLATES, *Gallenkamp*, **rectangular, for bench mounting,** supplied with mains lead. For 220/240V a.c. supplies. Dimensions 48 × 28 cm. Power rating 2 kW. Weight 18 kg.

List No.	Control	°C Max.	Each	
HL-052	Energy regulator	400	**£34. 0. 0.**	*b*
HL-054	Thermostat	300	**£34. 0. 0.**	*b*

Available for other voltages to order.

HL-054 with hobs HL-055

ACCESSORY

HL-055 Hob, stainless steel, 48 × 10 cm, for rectangular hotplates. Provide useful extension to the working surface for simmering. One or two may be fitted.
Each £3. 4. 0. *b*

REPLACEMENT PART

HL-056 Element, 2000W, for HL-052 and HL-054.
Each £5. 8. 0. *c*

SURFACE TEMPERATURE MEASUREMENT

PC-980	Temperature indicating pencils.
PX-020 **PX-022**	Portable pyrometer with surface contact probe.
TJ-990	Surface contact dial thermometer.

COMBINED HOTPLATE/MAGNETIC STIRRER

A reliable, compact apparatus combining an energy regulator controlled hotplate with a variable speed stirrer. The hotplate is of aluminium with a totally enclosed sheathed element and can be set to temperatures up to 350°C. The stirrer produces from gentle to vigorous stirring action.

Full details, ordering specifications, price and accessories—see SS-615 under STIRRERS.

SS-615 with rod

When ordering hotplates or replacement elements please state voltage and nature of electricity supply.

All items on this page normally available from stock.

HL-085

HOTPLATE, electrically heated, 20 cm diameter solid top, 17 cm high, 1·8 kW loading. With ventilated case, vitreous enamel finish. Weight 5 kg. Fitted with Simmerstat control for 230/250V a.c. single phase supplies.
Each **£5. 10. 6.** *m*

HL-087

HL-087

HOTPLATE, as HL-085 but fitted with 3-heat switch for 230/250V a.c. single phase or d.c. supplies.
Each **£4. 15. 0.** *m*

HL-090

HL-090

HOTPLATE, rectangular, electrically heated, with 2 kW heated plate 22×15 cm set into the metal top surface. Overall dimensions 40×20×15 cm high. Weight 7 kg. Fitted with Simmerstat control for 230/250V a.c. single phase supplies only ... ... Each **£8. 5. 0.** *m*

HL-100

HL-100

HOTPLATES, electrically heated, machined cast-iron top, stoved enamel steel body. Maximum surface temperature about 315°C. Fitted with Simmerstat control. The 60×45 cm plate has a top in two sections and a maximum surface temperature about 300°C. For 230/250V a.c. single phase supplies.

Size cm	Loading kW	Elements		Weight kg approx.	Each	
		No.	Length, cm			
23×20	1	4	18	6	**£16. 4. 0.**	*m*
30×20	1·5	6	18	9	**£20. 13. 0.**	*m*
45×30	2·7	8	23	21	**£29. 15. 0.**	*m*
60×30	3·3	10	23	28	**£43. 0. 0.**	*m*
60×45	4	12	23	40	**£57. 6. 0.**	*m*

REPLACEMENT PARTS

HL-107	**Element, 18 cm**	Each	**£0. 19. 8.**	*f*
HL-108	**Element, 23 cm**	Each	**£1. 4. 9.**	*f*

LOW TEMPERATURE HOTPLATE see HJ-620 in List No. sequence

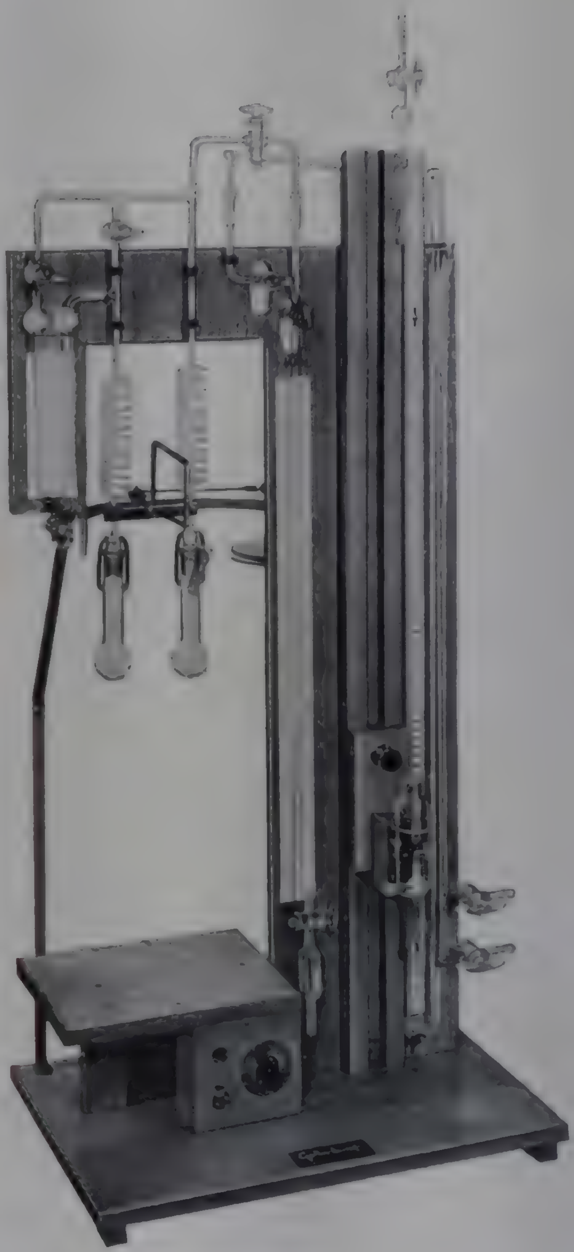
All above hotplates are available for other voltages to order. When ordering please state voltage and nature of supply.

All items on this page normally available from stock.

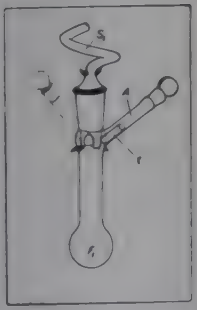
Gallenkamp MICRO HYDROGENATION APPARATUS

The micro apparatus is designed for measuring the hydrogen uptake of a few milligrammes of material at constant pressure (approx. atmospheric pressure). Without taking any special precautions it has an accuracy of the order of ±2–3% of the theoretical uptake. This accuracy can be improved by operating the apparatus under constant temperature conditions. Excellent results can be obtained on 3 to 5 mg of substance, but the optimum amount will depend on the degree of unsaturation.

The designer has had in mind the possibility of this apparatus being used by research workers themselves rather than by the micro-analyst exclusively, and the apparatus is sufficiently robust to withstand the varied degree of handling it will receive when operated by a number of users.



HR-100



DESCRIPTION

The apparatus can be readily dismantled into three sections for periodical cleaning. All the glass stopcocks and interchangeable ground joints are of first class, high vacuum quality. It will give reliable and reproducible results over a long period of time and with the minimum of attention. It consists essentially of a reaction flask with sidearm to hold a small tube containing the substance to be hydrogenated, and a compensating flask of equivalent volume arranged in parallel. Both flasks are connected by means of flexible glass spirals to the volume measuring burette and manometers. Efficient agitation of the contents of the flask is effected by shaking the flask to and fro by means of the motor and eccentric provided. The glass spirals are sufficiently robust to withstand vigorous shaking. The burette is approximately 5 cm³ capacity. Two manometers are used, one a short sensitive butyl phthalate manometer to register slight changes of pressure, and the other a mercury manometer used for setting the apparatus to atmospheric pressure and for determining roughly the degree of evacuation before admitting hydrogen. The small inset illustration of the reaction vessel illustrates the neat way in which the sample tube is dropped into the reaction flask as and when required by the experiment. This is effected simply by rotating the reaction flask on its ground joint.

Overall dimensions 120 × 55 × 36 cm.

HR-100
HYDROGENATION APPARATUS, micro, *Gallenkamp*, as specification, with instructions, but **without mercury or water bath.** Requires approximately 3 kg mercury ... ... Each **£104. 0. 0.** *bN*

REPLACEMENT PARTS

HR-101	**Burette,** 5 cm³ with three stopcocks and two 10/13 socket joints	Each	£9. 0. 0.	*a*
HR-102	**Levelling bottle**	Each	£0. 9. 6.	*a*
HR-103	**Bubbler valve,** for hydrogen ..	Each	£1. 0. 0.	*a*
HR-104	**Flask,** without sidearm	Each	£0. 9. 3.	*a*
HR-105	**Flask,** with stoppered sidearm ...	Each	£1. 7. 6.	*a*
HR-108	**Flask,** with 2-way stopcock, for butyl phthalate.	Each	£1. 11. 0.	*a*
HR-109	**Connecting springs**	Dozen	£0. 9. 6.	*b*
HR-110	**Manifold,** with manometer, 4 stopcocks T_1, T_2, T_3, and T_4, spirals S_1 and S_2, and one 10/13 cone joint.	Each	£11. 0. 0.	*a*
HR-111	**Manometer,** with 3 stopcocks T_7 and T_8 and one 10/13 cone joint	Each	£7. 0. 0.	*a*

ACCESSORIES

HR-112	**Water bath,** with adjustable stand.	Each	£8. 15. 0.	*bN*
MF-932	**Mercury,** triple distilled. For details and prices see entry in List No. Sequence.			

HYDROGEN-ION (pH) DETERMINATION

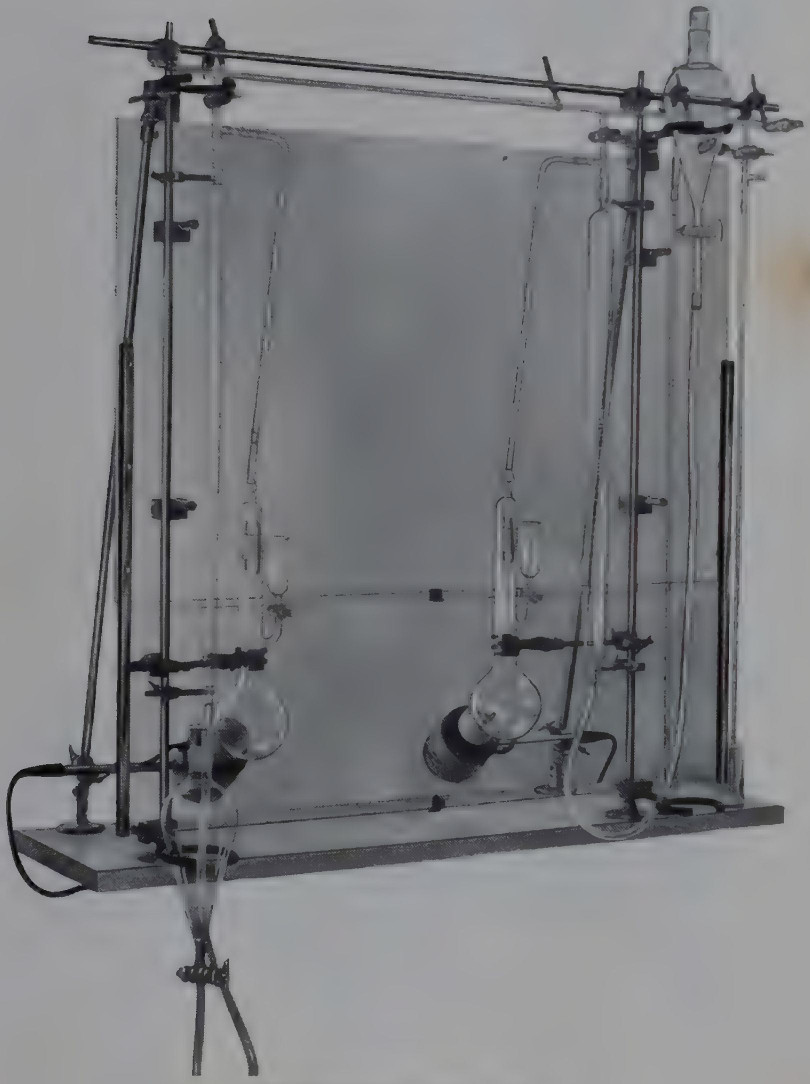
ALL APPARATUS FOR THIS PURPOSE IS LISTED UNDER

ELECTROCHEMICAL APPARATUS

Items on this page normally available from stock exept those coded *N*.

Gallenkamp TWIN HYDROGENATION APPARATUS

- **Simultaneous hydrogenation of two samples**
- **Two burette sizes—readily interchangeable**
- **Perspex safety screen**
- **Choice of magnetic stirring or flask shaking**
- **Volumes measured over water—less mercury needed**
- **Ideal for educational use**



HR-160 with accessories

This apparatus is for the qualitative and quantitative hydrogenation at atmospheric pressure of organic substances in amounts varying between 0·5 and 5 g according to molecular weight and degree of unsaturation.

It is of simple design and employs water as the displaceable medium in the measuring burettes, thus making it possible to measure hydrogen uptake with reasonable accuracy without having to take any special precautions and without the need for large quantities of mercury. Care has been taken throughout to eliminate trouble from leaking taps or joints.

DESCRIPTION

The main structure of the apparatus is a rigid Lablox scaffold framework, the members of which are strong ½ in dia. aluminium alloy rods. The glassware is supported on this framework with corrosion resistant polythene coated spring clips. The framework stands on a substantial baseboard which is covered with white melamine—an easily cleaned plastics laminate.

The general layout provides for rapid evacuation and filling with hydrogen and permits two independent hydrogenations to be carried out simultaneously on the one apparatus.

Two burettes are connected to a manifold via high quality stopcocks. The burettes may have a capacity of either 100 or 500 cm³, and together with their respective reaction flasks, they may be used quite independently of each other. Thus one system may have hydrogenation in progress whilst the other is being prepared. A mercury manometer indicates the pressure in the apparatus and is used to check for gas tightness. The pressure of hydrogen to the apparatus is limited by a manometric pressure regulator. Water reservoirs are used to bring the hydrogen to atmospheric pressure when the initial and final readings are taken.

A ¼ in thick Perspex safety screen which is fitted over the front of the apparatus has a sliding lower section giving easy access to the reaction flasks. All glass joints are butted and sealed with clear vinyl tubing which is also used for the flexible connectors.

Very efficient agitation can be obtained using a Handilab stirrer fitted with magnetic stirring rotor. The stirrer is supported on the main framework. Alternatively a flask shaker SD-100 may be used.

HR-160

HYDROGENATION APPARATUS, general purpose, *Gallenkamp*, complete as specification with one 100 cm³ and one 500 cm³ burette, but **without mercury, stirrers or shakers** ... ... Each **£62. 0. 0.** *b*

ACCESSORIES

SS-425	**Handilab stirrer,** *Gallenkamp*, with magnetic stirring rotor and	For details and prices see entries in List No. sequence.
SS-444	polypropylene covered magnetised follower 12 mm. (Two	
SS-636	assemblies required) ...	
SD-100	**Shaker.**	
MF-932	**Mercury,** triple distilled.	

REPLACEMENT PARTS

HR-164	**Burette,** 100 cm³	Each	**£2. 12. 0.**	*a*
HR-166	**Burette,** 500 cm³	Each	**£2. 18. 0.**	*a*
HR-168	**Burette manifold,** complete with two stopcocks.	Each	**£3. 0. 0.**	*a*
HR-170	**Charging manifold,** complete with three stopcocks.	Each	**£3. 12. 0.**	*a*
HR-172	**Manometer tube**	Each	**£0. 6. 0.**	*a*
HR-174	**Mercury reservoir,** for manometer and pressure regulator	Each	**£0. 2. 6.**	*a*
HR-176	**Antisplash device,** for fitting to the pressure regulator.	Each	**£0. 3. 3.**	*a*
HR-178	**Reaction flask,** with side mounted tap funnel and 29/32 socket	Each	**£2. 17. 0.**	*a*
HR-180	**Reaction flask adapter,** with 29/32 cone and tubing connector	Each	**£0. 12. 6.**	*a*
HR-182	**Tube,** connecting, for use with magnetic stirrers.	Each	**£0. 6. 0.**	*a*
HR-184	**Tube,** connecting, for use with flask shaker.	Set	**£0. 10. 6.**	*a*
HR-186	**Water reservoir**	Each	**£1. 18. 0.**	*a*
TX-774	**Tubing,** PVC, water clear transparent grade, 8 mm bore. For price see entry in List No. sequence.			

All items on this page normally available from stock.

Technico HYDROMETERS TO BS 718

REGD. TRADE MARK

DESCRIPTION

These hydrometers are accurately adjusted to measure mass per unit volume, in grammes per millilitre at 20°C or specific gravity 60°/60°F. Three series of BS hydrometers are listed and each series is designated by a combination of the overall length and the scale intervals covered. Thus L50 is a long hydrometer in which the nominal range interval is 0·50 g/ml. Each series covers the range of density or specific gravity normally required in hydrometry, namely 0·60 to 2·00 g/ml or sp. gr. Each hydrometer is torpedo shaped, and shot and wax poised.

CALIBRATION

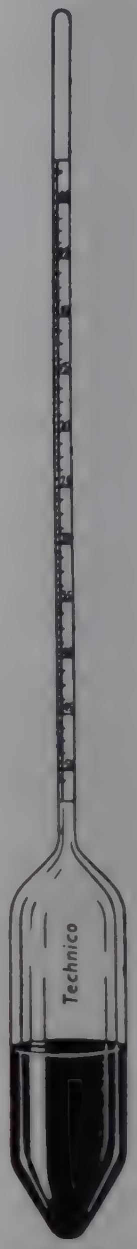
Each series of normal tolerance hydrometers can be adjusted at the following surface tensions:
Any range from 0·60 to 2·00 can be adjusted for low surface tension liquids.
Any range from 1·00 to 2·00 can be adjusted for medium or high surface tension liquids.

ORDERING PROCEDURE

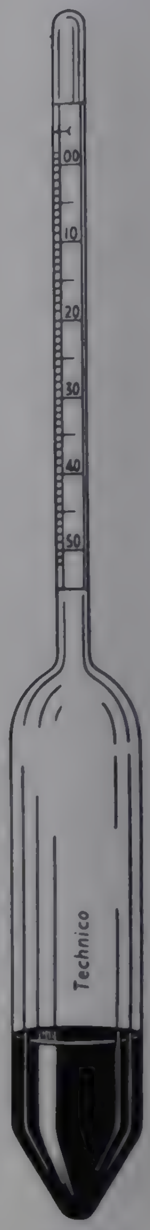
Please specify: (1) List No. (2) Surface tension. (3) Range required.

HYDROMETERS, *Technico*, **to BS 718,** density or specific gravity, tolerances ± one scale subdivision.

List No.		BS Series	Nominal scale range g/ml or sp. gr.	Scale sub-division g/ml or sp. gr.	Overall length max mm	Bulb dia. max mm	Price each		
Density g/ml 20°C	Specific gravity 60°/60°F						Ranges 0·60–0·65 or above 1·60	All other ranges	
HT-100	**HT-102**	L50	0·050	0·0005	335	27	£1. 9. 0.	£1. 6. 6.	*a*
HT-110	**HT-112**	M50	0·050	0·001	270	24	£1. 3. 0.	£1. 0. 0.	*a*
HT-130	**HT-132**	S50	0·050	0·002	190	20	£1. 0. 0.	£0. 15. 6.	*a*



HT-100
HT-150



HT-110
HT-160

Technico IP and STPTC HYDROMETERS

REGD. TRADE MARK

Hydrometers to IP 160 and STPTC specifications are now identical with the L50 and M50 series of BS 718 but have special tolerances as laid down in this BS and, also, are calibrated in liquids of 'low' surface tension. Thus these hydrometers are suitable for use in organic liquids generally, as well as in petroleum and tar distillates. The range covered by these hydrometers is somewhat shorter—0·60 to 1·10 g/ml at 15°C or sp. gr. 60°/60°F.

HYDROMETERS, *Technico*, **to IP 160, STPTC and BS 718 special tolerances,** for liquids of low surface tension, range 0·60 to 1·10.

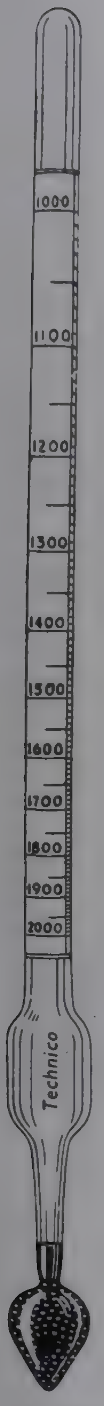
List No.		BS Series	Tolerance g/ml or sp. gr. ±	Price each		
Density g/ml 15°C	Specific gravity 60°/60°F			Range 0·60–0·65	All other ranges	
HT-150	**HT-152**	L50SP	0·0003	£1. 14. 0.	£1. 10. 0.	*a*
HT-160	**HT-162**	M50SP	0·0006	£1. 7. 0.	£1. 3. 0.	*a*

All items on this page are manufactured to special order only.

SPECIAL PURPOSE HYDROMETERS

Density hydrometers to BS 734 for milk see DC-900 in List No. sequence.

Alfloc **hydrometers** see **WATER TESTING**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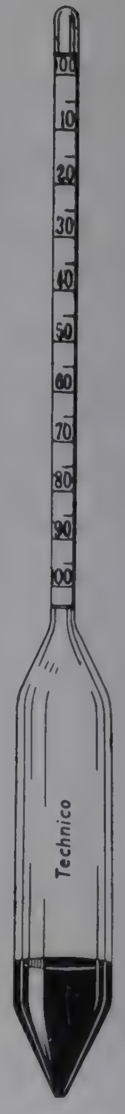
HT-200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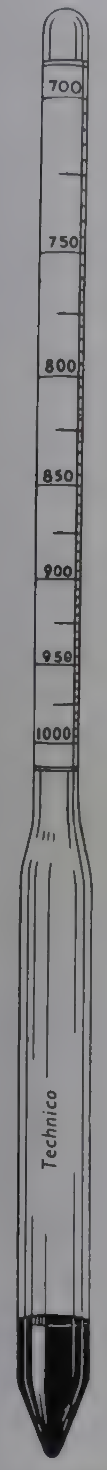
HT-260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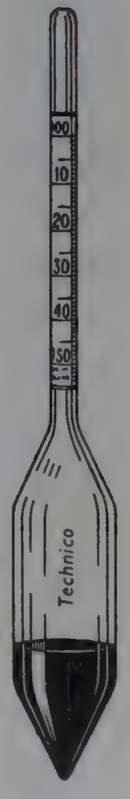
HT-220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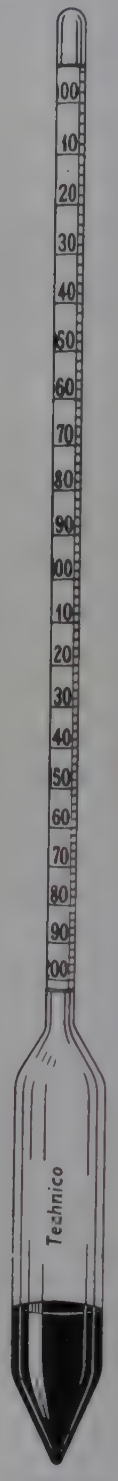
Technico

HT-280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Technico

HT-240

Technico

REGD. TRADE MARK

SPECIFIC GRAVITY HYDROMETERS

Calibrated at 60°F

HT-200

HYDROMETER, *Technico*, shot weighted, covering range 1·00 to 2·00, subdivided in 0·01. Overall length 28 to 30 cm ... ... Each **£0.10. 9.** *a*

HT-220

HYDROMETERS, *Technico*, streamline, shot weighted, covering ranges indicated.

Range	0·70 to 1·00	1·00 to 1·50	
Subdivisions	0·005	0·005	
Length	25 to 30	30 to 35 cm	
Dozen	**118/–**	**118/–**	*a*
Each	**10/9**	**10/9**	

HT-240

HYDROMETERS, *Technico*, **two hundred degree series,** streamline, shot weighted. Ranges subdivided in 0·002. Overall length 22 to 24 cm. Ranges 0·60 to 1·00 adjusted for low surface tension (25–30 dymes/cm). Ranges 1·00 to 2·00 adjusted for medium surface tension (55 dynes/cm).

Range	0·60 0·80	0·80 1·00	1·00 1·20	1·20 1·40	1·40 1·60	1·60 1·80	1·80 2·00	
Dozen	**155/–**	**108/–**	**108/–**	**108/–**	**108/–**	**125/–**	**125/–**	*a*
Each	**14/–**	**10/–**	**10/–**	**10/–**	**10/–**	**11/3**	**11/3**	

HT-260

HYDROMETERS, *Technico*, **hundred degree series,** streamline, shot weighted. Ranges subdivided in 0·001. Overall length 22 to 24 cm. Ranges 0·60 to 1·00 adjusted for low surface tension (25–30 dynes/cm). Ranges 1·00 to 2·00 adjusted for medium surface tension (55 dynes/cm).

Range	0·60 0·70	0·70 0·80	0·80 0·90	0·90 1·00	1·00 1·10	1·10 1·20	1·20 1·30	
Dozen	**155/–**	**108/–**	**108/–**	**108/–**	**108/–**	**108/–**	**108/–**	*a*
Each	**14/–**	**10/–**	**10/–**	**10/–**	**10/–**	**10/–**	**10/–**	
Range	1·30 1·40	1·40 1·50	1·50 1·60	1·60 1·70	1·70 1·80	1·80 1·90	1·90 2·00	
Dozen	**108/–**	**108/–**	**108/–**	**125/–**	**125/–**	**125/–**	**125/–**	*a*
Each	**10/–**	**10/–**	**10/–**	**11/3**	**11/3**	**11/3**	**11/3**	

HT-280

HYDROMETERS, *Technico*, **fifty degree series,** streamline, shot weighted. Ranges subdivided in 0·001. Overall length 15 to 18 cm. Ranges 0·60 to 1·00 adjusted for low surface tension (25–30 dynes/cm). Ranges 1·00 to 1·65 adjusted for medium surface tension (55 dynes/cm).

Range	0·60 0·65	0·65 0·70	0·70 0·75	0·75 0·80	0·80 0·85	0·85 0·90	0·90 0·95	
Dozen	**155/–**	**108/–**	**100/–**	**100/–**	**100/–**	**100/–**	**100/–**	*a*
Each	**14/–**	**10/–**	**9/3**	**9/3**	**9/3**	**9/3**	**9/3**	
Range	0·95 1·00	1·00 1·05	1·05 1·10	1·10 1·15	1·15 1·20	1·20 1·25	1·25 1·30	
Dozen	**100/–**	**100/–**	**100/–**	**100/–**	**100/–**	**100/–**	**100/–**	*a*
Each	**9/3**	**9/3**	**9/3**	**9/3**	**9/3**	**9/3**	**9/3**	
Range	1·30 1·35	1·35 1·40	1·40 1·45	1·45 1·50	1·50 1·55	1·55 1·60	1·60 1·65	
Dozen	**100/–**	**100/–**	**100/–**	**100/–**	**100/–**	**100/–**	**114/–**	*a*
Each	**9/3**	**9/3**	**9/3**	**9/3**	**9/3**	**9/3**	**10/3**	

All items on this page normally available from stock.

HT-300

HYDROMETERS, Baume, streamline, shot weighted. Overall length 25 to 27 cm. **For light liquids.**

Conversion:—$^\circ B=\frac{144\cdot3}{\text{sp. gr.}}-144\cdot3$

Range	0 – 40	0 – 70 °B	
Subdivided in	0·5	1·0	
Dozen	**99/–**	**109/–**	m
Each	**10/–**	**11/–**	

HT-305

HYDROMETERS, Baume, as HT-300 but for **heavy liquids.**

Conversion:— $^\circ B=144\cdot3-\frac{144\cdot3}{\text{sp. gr.}}$

Range	0 – 25	0 – 50	0 – 70 °B	
Subdivided in	0·5	1·0	1·0	
Dozen	**114/–**	**114/–**	**135/–**	a
Each	**10/3**	**10/3**	**12/3**	

HT-320

HYDROMETERS, Twaddell, streamline, shot weighted, overall length 180 mm. Water is taken as 0°Tw and each Twaddell degree equals 0·005 sp. gr. Conversion:—Specific gravity=(°Tw × 0·005)+1·000.

Range °Tw	0	24	48	74	102	
	24	48	74	102	138	
Sp. gr. range	1·00	1·12	1·24	1·37	1·51	
	1·12	1·24	1·37	1·51	1·69	
Dozen	**74/–**	**74/–**	**74/–**	**88/–**	**88/–**	a
Each	**7/4**	**7/4**	**7/4**	**8/3**	**8/3**	

HT-340

HYDROMETER, accumulator, syringe type. Comprising transparent plastics syringe with suction bulb, delivery tube and shot-weighted hydrometer float, range 1·10 to 1·30 ... Dozen **£4. 14. 0.** Each **£0. 8. 9.** c

HT-348

HYDROMETER, Nicholson, constant displacement pattern for determination of specific gravity of solids. Can also be used for comparison of specific gravities of different liquids. Student model in japanned tinned steel, length 24 cm, dia. 40 mm. **Without weights.**
Dozen **£19. 0. 0.** Each **£1. 15. 0.** c

HT-380

BRINOMETER, streamline, shot weighted, covering range 0 to 26% NaCl at 15°C. Overall length 25 cm, approximately ... ... Each **£0. 9. 9.** a

HT-300
HT-305
HT-320

HT-340

GALLENKAMP
HT-348

HYDROMETER TRIAL JARS

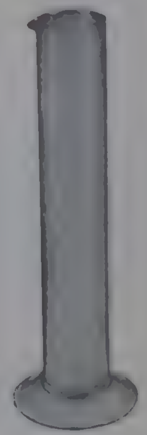
HT-500

HYDROMETER TRIAL JARS, glass with spout, on foot.

Height	15	20	25	30	30	35	45 cm	
Dia.	4	5	5	5	8	5	5 cm	
Dozen	**44/–**	**59/–**	**66/–**	**72/–**	**120/–**	**84/–**	**145/–**	c
Each	**5/–**	**6/2**	**6/8**	**7/2**	**11/–**	**8/–**	**13/3**	

HT-520

HYDROMETER TRIAL JAR, polythene, with foot. When a hydrometer is inserted into the jar filled with liquid, the overflow is caught in an annular well at the top. Overall height 30 cm, diameter 5·5 cm.
Each **£2. 6. 0.** c


HT-500

HT-520

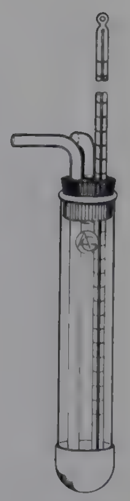
All items on this page normally available from stock.

DEW POINT HYGROMETERS

HV-010

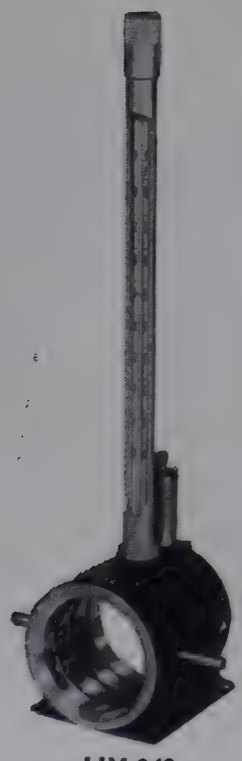
HYGROMETER, Regnault, comprises a glass tube fitted with chromium plated copper thimble, rubber stopper and glass air tubes. **Without thermometer.** Each **£1. 17. 0.** *a*

Suitable thermometer see TJ-174 in List No. sequence.

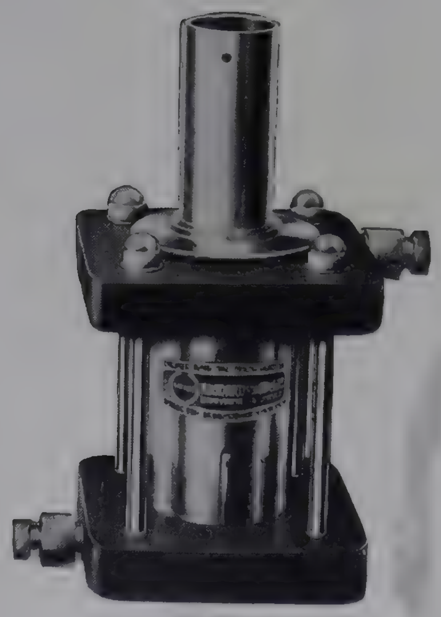


HV-010 with thermometer

HV-060



HV-040



HV-080

HV-040

HYGROMETER, dew point, for use with 10 ml samples or, for higher accuracy, with a continuous stream of gas. The sample chamber is separated from the ether vessel by a thin, polished stainless steel mirror upon which the dew forms. The bulb of the 12·5 cm scale, insulated stem thermometer is placed adjacent to the mirror. Ether is evaporated by bubbling air through it from a rubber aspirator, a constriction in the pipe giving close control of the cooling rate. With thermometer −15 to +35°C in 0·5°C ... ... Each **£9. 0. 0.** *m*

ACCESSORIES AND REPLACEMENTS

HV-042 **Thermometers,** insulated pattern, with 12·5 cm scale.

Range	0 to 90°F	—15 to +35°C	
Subdivision	1°F	0·5°C	
Each	£1. 17. 6.	£1. 17. 6.	*m*

HV-044 **Rubber aspirator,** for evaporating ether. Each **£0. 17. 6.** *m*

ALNOR DEW POINT METER

A self contained instrument for determining the dew point of gaseous samples down to −60°C. The sample, compressed to a known pressure, is made to expand adiabatically to atmospheric pressure, and the ratio of sample pressure to atmospheric pressure noted on the direct reading 'Pressure Ratio' gauge. If the sample has cooled to below its dew point a mist is observed in the illuminated pressure chamber. At a particular 'pressure ratio' the mist will just vanish, and by noting this ratio and the initial temperature the dew point is determined using the calculator provided. The simplicity of operation ensures repeatable readings and an accuracy of ±1·5°C can be obtained.

HV-060

DEW POINT METER, Alnor, as specification. With hand pump for gaseous samples having pressures not exceeding 3·5 kg/cm², 'Pressure Ratio' gauge scaled 1·0 to 0·25, initial temperature thermometer, sample inlet and outlet nozzles, purging valve, glass fibre filter, spare gauge oil, battery and instructions for use. A recessed electrical socket and plug without cable are provided for 100/250V a.c. single phase supplies if mains operation is preferred ... ... Each **£160. 0. 0.** *mN*

DEW POINT METER

For determination of moisture content of gases by measurement of the dew point down to −65°C. The results obtained with this instrument bear a very close relationship with moisture contents determined gravimetrically and electrolytically, but below −30°C the supplied comparison curves should be used.

CONSTRUCTION

A wide glass tube is clamped between two aluminium blocks into which the inlet and outlet gas connections are tapped. A highly polished chromium plated brass inner cup stands inside the tube and can be moved easily for cleaning and filling.

OPERATION

Gas entering the lower connection at approximately 1 litre/min impinges on the inner vessel which contains a liquid of low freezing point and a little solid CO_2. When a visible condensation occurs near the inlet jet, the thermometer is read and the moisture content calculated.

HV-080

DEW POINT METER, as specification, for measuring dew points down to −65°C, with thermometer scale span −120 to +30°C ... ... Each **£20. 0. 0.** *f*

Items on this page normally available from stock except those coded *N*.

WET AND DRY BULB HYGROMETERS

HV-100

HYGROMETER, Mason wet and dry bulb, with two thermometers on polished zinc scale covering range 20 to 120°F in 1°F. In hard white plastics frame with plastics reservoir and spare wicks... Each **£2. 0. 0.** *c*

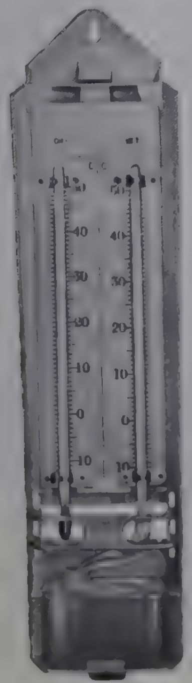
HV-101

HYGROMETER, Mason, as HV-100 but scaled 0 to 50°C in 1°C ... ... Each **£2. 0. 0.** *c*

REPLACEMENT PARTS

HV-102	**Wick, cotton**	Pack of 6	**£0. 3. 6.**	c
HV-104	**Reservoir, plastics**	Each	**£0. 4. 0.**	c

Hygrometers as HV-100, HV-101 conforming to BS 2841, quotation on application.


HV-100
HV-101

HV-120
HV-121

HV-120

HYGROMETER, Mason, wet and dry bulb, NPL accuracy. With two thermometers covering range 0 to 100°C, subdivided in 1°, **for use in humidity ovens.** The thermometers are divided on the stems, with subsidiary scales on a white porcelain background. In a copper case with plastics reservoir and wick. Each **£5. 10. 0.** *m*

HV-121

HYGROMETER, Mason, as HV-120 but with thermometers of range 0 to 50°C subdivided 0·5°C for ambient humidity measurements ... ... Each **£5. 0. 0.** *m*

REPLACEMENT PARTS

HV-102 **Wick, cotton**
HV-104 **Reservoir, plastics**
} For prices see entries in List No. sequence.

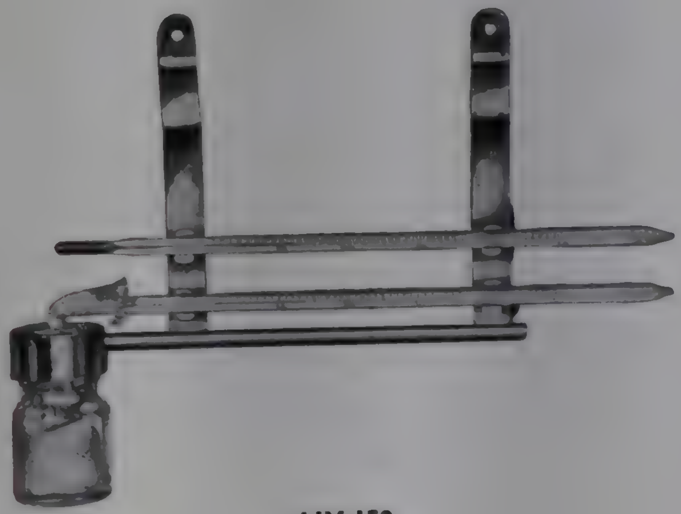
HV-150

HYGROMETERS, *Gallenkamp*, wet and dry bulb, for use in humidity oven OV-600, and for wall or shelf mounting. A matched pair of thermometers of NPL accuracy, 20 cm long, with scales engraved on the stems are held horizontally by polythene coated clips on a polished metal frame. A glass reservoir screws into a holder at one end of the frame and is easily removable for refilling.

Range	0 to 50	0 to 100 °C	
Subdivided	0·5	1·0 °C	
Each	**£5. 14. 0.**	**£5. 14. 0.**	*b*

REPLACEMENT PARTS

HV-152	**Wick, cotton** ... ... Dozen	**£0. 9. 9.**		c
HV-156	**Thermometers,** matched pair.			
	Range	0 to 50	0 to 100 °C	
	Subdivided	0·5	1·0 °C	
	Pair	£2. 9. 0.	£2. 9. 0.	c


HV-150

HV-200

HYGROMETER, whirling, to BS 2842, with two solid stem lens front thermometers, scale length 10 cm, covering range 20 to 120°F in 1°. The wooden frame has a plastics reservoir at one end into which the wick dips thus keeping the bulb continuously moistened. Complete with simple plastics slide rule. Each **£4. 0. 0.** *m*

HV-201

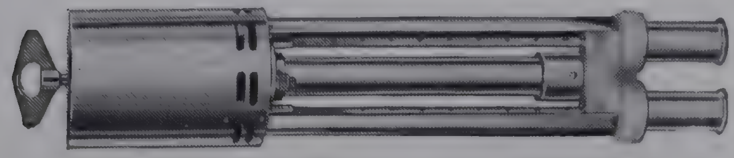
HYGROMETER, whirling, as HV-200 but with thermometers of range —5 to 50°C in 0·5°C. Each **£4. 0. 0.** *m*

ACCESSORIES AND REPLACEMENTS

HV-202	**Thermometers.** Range	20 to 120°F	—5 to 50°C	
	Each	£0. 13. 6.	£0. 13. 6.	m
HV-206	**Case, leather, for HV-200** ... ... Each		£1. 2. 0.	m
HV-208	**Wick, cotton** ... ... Pack of 25		£0. 2. 6.	m

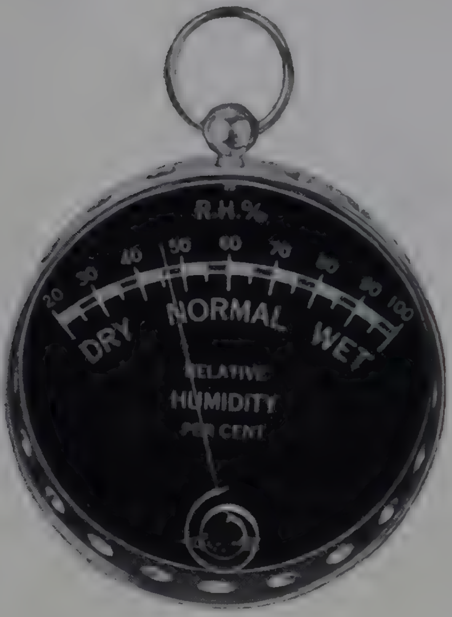
HV-200

All items on this page normally available from stock.



HV-240
HV-241

HV-260
HV-262



HV-400

0
10
20
30
40
50
60
70
80
90
100
RELATIVE HUMIDITY PER CENT

HV-450

HV-240

HYGROMETER, Assmann, British Meteorological Office pattern, with spring driven fan to keep the wet bulb ventilated until the equilibrium point is reached. This provides very accurate readings and the results may be used as standard for comparing other humidity measuring instruments. The bulbs of the two solid stem thermometers, covering the range 20 to 120°F in 1°, are screened from radiation by polished and plated tubes, enabling the instrument to be used even in bright sunlight. The thermometers are held in a metal frame on which the fan is mounted. The instrument is contained in a polished wood case and is supplied with wick, wick moistener, a suspension rod, and simple plastics slide rule.

Each **£57. 0. 0.** *mN*

HV-241

HYGROMETER, Assmann, as HV-240 but with thermometers of range −5 to 50°C in 0·5°C.

Each **£57. 0. 0.** *mN*

ACCESSORIES AND REPLACEMENTS

HV-242	**Thermometers.**			
	Range	20 to 120°F	−5 to 50°C	
	Each	£2. 0. 0.	£2. 0. 0.	*mN*
HV-246	**Wick, cotton**		Pack of 25 £0. 2. 6.	*m*

HV-252

TABLES, for use with whirling and aspirated hygrometers, for converting wet and dry bulb readings to relative humidity values. For Fahrenheit thermometers.

Set **£0. 5. 0.** *m*

HV-254

TABLES, as HV-252 but for use with Centigrade thermometers ... ... Each **£0. 12. 6.** *m*

HV-260

CALCULATOR, humidity slide rule, to British Meteorological Office design for the determination of relative humidity, dew point, frost point, vapour pressure and absolute humidity from psychrometric readings. Temperature range covered −130 to +110°F. The slider is scaled on one side for screen hygrometers and on the other for whirling and aspirated hygrometers. With case and instructions ... ... Each **£4. 5. 0.** *m*

HV-262

CALCULATOR, as HV-260 but with temperature scale of −90 to +43°C ... ... Each **£4. 5. 0.** *m*

HV-400

HYGROMETER, PAPER. In 7·5 cm diameter plastics case, with scale 20 to 100% RH subdivided every 5% ... ... Each **£2. 18. 0.** *m*

HV-410

HYGROMETER, PAPER, as HV-400 but with bimetallic dial thermometer covering range 30–130°F.

Each **£4. 12. 0.** *m*

HV-450

HYGROMETER, HAIR, covering range 0 to 100% RH, the scale occupying 210° of arc. In 12·5 cm diameter chromium plated brass case with anodised dial.

Each **£8. 15. 0.** *m*

Items on this page normally available from stock except those coded *N*.

ICE MAKING AND CRUSHING

IC-255

ICE CUBE MAKER, an efficient, attractively styled unit with six quick release ice trays to produce 108 ice cubes every 3½ hours. Total capacity approximately 20 litres. The refrigerating unit has a hermetically sealed system with a low consumption compressor. For 205/245V 50 Hz single phase supplies. Dimensions 64 × 35 × 44 cm. Weight 33 kg... ... ... Each **£55. 0. 0.** *m*

IC-255

ICE FLAKE MAKING MACHINE, automatic, for continuous production and storage of ice flakes. The quoted ice production rates are maxima and occur with water supply at 5°C and an ambient temperature 10°C. At higher temperatures the production is less. Storage bins have stainless steel liners. Water inlet ¼ in S.A.E. flare. For 220/240V 50 Hz supplies.

	***IC-277**	***IC-282**	
Model No.	DF-4	SF-75WSH	
Ice production	50 kg/24 hr	100 kg/24 hr	
Bin capacity	15 kg	45 kg	
Bin door	front opening	top sliding	
Compressor (air cooled)	⅛ hp	¼ hp	
Dimensions	46 × 62 × 92 cm high (no legs)	87 × 66 × 112 cm high (with legs)	
Net weight	67 kg	150 kg	
Each	**£295. 0. 0.**	**£397. 0. 0.**	*f*

Price includes installation in the U.K.

IC-282

IC-320

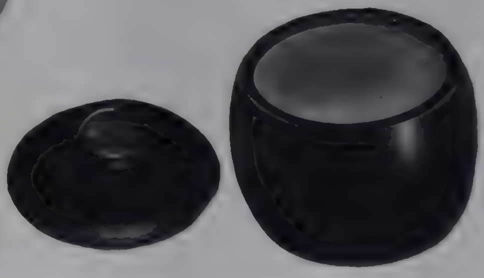
ICE SHAVING MACHINE, hand operated, for reducing ice lumps to a fine powder. Comprises 10 cm diameter, aluminium alloy hopper, with stainless steel rotating cutting blades, mounted on a stable base 23 × 13 cm. Capacity 7 kg (15 lb) ... Each **£22. 10. 0.** *mS*

IC-330

ICE STORAGE CONTAINER, double walled, with polythene liner and polystyrene outer case and lid. Internal dimensions approx. 13 cm dia. × 10 cm deep. Nominal capacity 1 litre.

Dozen **£8. 0. 0.** Each **£0. 14. 6.** *cS*

IC-320



IC-330

Items on this page coded S normally available from stock.

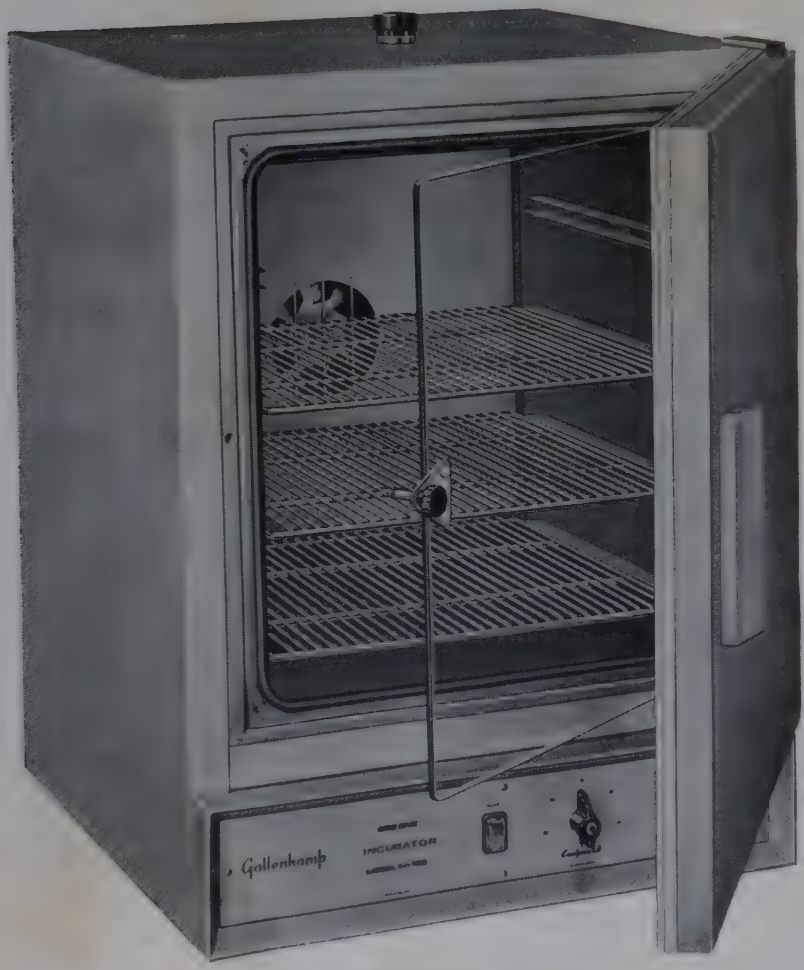
Gallenkamp ANHYDRIC

FAN CONVECTION MODEL

A range of high quality anhydric incubators, for use in the fields of biology and microbiology, bacteriology, virology, epidemiology, pathology and biochemistry.

- **Direct reading *Compenstat* temperature control with coupled safety thermostat**
- **Stainless steel interior**
- **Toughened plate glass inner door with neoprene gasket**
- **Unitised control panel for easy servicing and recessed to minimise accidental alteration of controls**
- **No water jacket leakage hazard**

For suitable **FLOOR STANDS** see **OV-480** to **OV-484** in **Addenda.**



IH-100

PERFORMANCE

Data when tested according to BS 2648† methods.

Size No.		1	2	3	
Temperature range		7°C above ambient to 100°C			
Temperature fluctuation	at 38°C	0·2	0·2	0·2	°C
	at 100°C	0·1	0·1	0·1	°C
Temperature variation	at 38°C	±0·25	±0·25	±0·5	°C
	at 100°C	±1·0	±1·5	±2·0	°C
Time to heat	to 38°C	15	25	20	min
	to 100°C	65	100	100	min
Recovery time after door opened one minute	at 38°C	6	6	6	min
	at 100°C	20	20	20	min

† British Standard 2648 defines and specifies performance requirements under conditions of test and using methods of measurement which are precisely described. Although intended for testing unloaded drying ovens, the test methods form an excellent basis for comparing incubators. Copies of the standard are available from BRITISH STANDARDS INSTITUTION, Newton House, 101 Pentonville Road, London, N.1.

DESIGN

Exterior. Easily cleaned and free from dust traps, the exterior is finished in hard wearing light grey stoved enamel. The outer door has a rubber magnetic gasket and the inner glass door closes on a neoprene gasket.

Interior. Constructed from chemically resistant, semi-polished stainless steel to BS 971, EN 58B with fixed shelf runners and an easily removed baffle at the rear which guards the fan and heater.

Shelves. The 12·5 mm spaced grid steel wire shelves are heavily nickel and chromium plated to BS 1224 Grade 1S.

Air circulation and heating. Air drawn from the centre of the incubator is recirculated to the top and bottom of the workspace by the rear mounted fan. The heater, which is sheathed in stainless steel, surrounds the fan and is screened from the workspace by the baffle.

Temperature controls. A direct reading *Compenstat* mechanically linked with a safety thermostat set to about 5°C above nominal control temperature maintains excellent and reliable temperature control.

Atmosphere control. An adjustable ventilator in the top of the incubator can be closed to shut off flow of outside air. This ventilator can also be lifted out to provide a 2·8 cm dia. port through which tubes may be fitted to feed gases other than air (e.g. CO_2, N_2, etc.) into the working space. The ventilator incorporates a clip to retain a mercury in glass thermometer.

INCUBATORS

FAN CONVECTION MODEL (continued)

DIMENSIONS

Size No.	1	2	3	
	H W D	H W D	H W D	
Internal	46×40×36	61×51×46	76×61×46	cm
	18×16×14	24×20×18	30×24×18	in
External	74×53×60	89×63×74	107×74×71	cm
	29×21×24	35×25×28	42×29×28	in
Shelves				
Size	38×34	48×44	58×44	cm
	15×13½	19×17½	23×17½	in
Number supplied	3	3	4	
Number of positions	4	5	6	
Interval between positions	11	11·5	12	cm
	4¼	4½	4¾	in
Max. shelf area	0·5	1·0	1·5	m²
	5·4	10·8	16	ft²
Weight, net	55	77	93	kg
	120	170	204	lb
Power rating, max.	250	250	500	W

IH-100

INCUBATORS, anhydric, *Gallenkamp,* **fan convection,** with direct reading *Compenstat* and safety thermostat, stainless steel interior, toughened glass inner door, shelves, mains and load indicator lamps. **Without thermometer.** For 50/60 Hz single phase supplies.

Size No.	1	2	3	
For 220/240V	£99. 10. 0.	£120. 0. 0.	£167. 10. 0.	*b*
For 200/210V	£99. 10. 0.	£120. 0. 0.	£167. 10. 0.	*bN*
For 110/120V	£99. 10. 0.	£120. 0. 0.	£167. 10. 0.	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

IH-105 **Heaters.**

Incubator Size No.	1	2	3	
Each	£2. 0. 0.	£2. 0. 0.	£2. 0. 0.	*b*

OV-172 **Fan motor**
OV-174 **Shelves**
} For prices see entries in List No. sequence.

ACCESSORIES

IH-110 **Thermometer,** red reflecting mercury, scale span 10 to 60°C in 1°. Dozen £12. 5. 0. Each £1. 2. 6. c

***IH-112** **Dial temperature indicator,** range 0 to 110°C. With instructions for fitting inside inner glass door. Each £3. 0. 0. c

LX-110 **Lubricant,** for motor bearings.
OV-176 **Basket shelves** ... ...
} For details see entries in List No. sequence.

Gallenkamp ECONOMY INCUBATOR

GRAVITY CONVECTION

CONSTRUCTION

The outer casing is of sheet steel finished in light grey enamel. The interior is of polished aluminium with two 12·5 mm spaced grid steel shelves and choice of four positions. The walls and door are insulated with fibreglass, the outer door having a heat-break, the inner glass door closing on to a neoprene gasket.

HEATING AND CONTROL

The heating elements are totally enclosed and there are no electrical connections within the working space. A hydraulic thermostat with a scale calibrated in °C gives good temperature control. The control knob has an OFF position and a neon lamp indicates when the heaters are on.

PERFORMANCE AND DIMENSIONS

Size No.	1	2	
Temperature range	ambient +5°C to 80°C		
Fluctuation at 38°C	0·5	0·5	°C
Variation at 38°C	2	3	°C
Heater rating	150	250	W
	H W D	H W D	
Internal dimensions	33×48×33	47 ×46 ×40	cm
	13×19×13	18½×18¼×15¾	in
External dimensions	56×59×49	70 ×57 ×59	cm
	22×23×19½	27½×22½×23½	in

IH-150

INCUBATORS, anhydric, *Gallenkamp,* **Economy,** with gravity convection, as specification, for a.c. single phase supplies.

Size No.	1	2	
For 220/240V	£46. 10. 0.	£60. 0. 0.	*b*
For 200/210V	£46. 10. 0.	£60. 0. 0.	*bN*
For 110/120V	£46. 10. 0.	£60. 0. 0.	*bN*

When ordering please state voltage and nature of supply.

IH-150

For suitable **FLOOR STAND** see **OV-482** in **Addenda.**

ACCESSORIES

OV-014 **Extra shelves,** sizes 1 and 2 ...
TJ-050 **Thermometer,** range —10 to 110°C ... ...
} For prices see entries in List No. sequence.

REPLACEMENT PART

IH-154 **Heating element.**

Incubator Size No.	1	2	
Each	£2. 0. 0.	£2. 0. 0.	*b*

Items on this page normally available from stock except those coded *N.*

Gallenkamp COOLED INCUBATORS

IH-330

OPERATION

Temperature is controlled by a *Compenstat* hydraulic thermostat with direct reading scale. Heating is by a sheathed heating element.

Cooling is provided by a refrigerating system with smooth running hermetically sealed compressor. The evaporator coil is mounted with the fan, heater and thermostat elements, in the air duct at the top of the working space.

The refrigerating system is run continuously when operating at temperatures below or near ambient, but may be switched off when working at higher temperatures. The *Compenstat* control head, refrigerator switch and the mains and heater indicator lamps are mounted in the control box on top of the incubator. A safety device is fitted inside the incubator to protect the refrigerating system in the event of overheating as a result of a control circuit failure. Working temperature is measured and indicated by a dial thermometer, range −20°C to +50°C, mounted in the door.

Suitable for Biochemical Oxygen Demand (B.O.D.) testing.
Incubation serum studies.
Enzyme testing.
Fruit fly cultivation.
Tissue culture work.
Immunology.
Long term sample storage.
Specimen conditioning.
Service testing at low ambient temperatures.

- *Compenstat* **controlled**
- **Temperature range 0° to 45°C approximately**
- **Accommodates 100 B.O.D. bottles**
- **Efficient ducted air circulation by fan**
- **Integral dial thermometer in door**
- **Magnetic door gasket**

CONSTRUCTION

The outer case is of steel, rust-inhibited and stove enamelled white. The liner is a smooth plastics moulding fitted with shelf supports allowing wide ranges of shelf positions and spacings. Three 18 mm grid, plated steel shelves are supplied. Two fit in the shelf supports; the third is not full depth and may be removed or fitted in front of the lower internal projection.

PERFORMANCE

Minimum temperature	0°C in 30°C ambient temperatures
	5°C ,, 35°C ,, ,,
	10°C ,, 40°C ,, ,,

Note: The incubator is unsuitable for use in ambient temperatures above 40°C.

Maximum temperature	45°C at all ambient temperatures
Cooling rate	Approx. 3 hours to cool from ambient to minimum temperature
Fluctuation	±0·25°C
Variation	±1°C

DIMENSIONS

	H W D
Internal	see diagram opposite
Overall	110 × 59 × 56 cm 43½ × 23 × 22 in
Shelves	Two 46·5×39 cm One 48×25 cm Eleven positions at 2·8 cm spacing
Capacity, gross	140 litres (5 ft³)
Weight, net	60 kg (132 lb)
Power rating, max.	375W

IH-330

INCUBATOR, COOLED, *Gallenkamp*, as specification, with *Compenstat*, door thermometer, shelves, ducted air circulation by fan, sheathed heating element and hermetically sealed compressor refrigeration unit. Suitable for operation in ambients up to 40°C.

For 220/240V 50 Hz single phase supplies.
Each **£128. 0. 0.** *g*

For 110/120V 60 Hz single phase supplies.
Each **£134. 0. 0.** *gN*

When ordering please state voltage and nature of supply.

REPLACEMENTS AND ACCESSORIES see next page.

Items on this page normally available from stock except those coded *N*.

COOLED INCUBATOR WITH FLUORESCENT ILLUMINATION

A modified version of IH-330 for simulating day and night conditions, particularly in plant studies. The incubator is fitted with six 12 in, 8W fluorescent lamps, mounted three on either side of the workspace. The intensity of illumination in an unloaded incubator is 75 lumens/ft^2 on any of the three equally spaced shelves. The lamps are controlled by a switch on the control box.

PERFORMANCE AND DIMENSIONS

As IH-330 except the following:

Minimum temperature	10°C in 30°C ambient
	15°C ,, 35°C ,,
	20°C ,, 40°C ,,
Power rating, max.	425W

IH-332

INCUBATOR, COOLED, *Gallenkamp*, as IH-330 but with **interior fluorescent illumination,** as specification. For 220/240V 50 Hz single phase supplies.
Each **£164. 0. 0.** *g*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS for IH-330, IH-332 and IH-340

IH-335	**Heater**	Each	**£3. 16. 0.**	*b*
IH-336	**Fan motor**	Each	**£2. 10. 0.**	c
VS-629	**Lamp, fluorescent,** 8W for IH-332 only. For price see entry in List No. sequence.			

When ordering replacement parts please state serial number of incubator and supply voltage.

ACCESSORIES

IH-338	**Shelf,** 46·5 × 39 cm	Each	**£1. 5. 0.**	*b*
LX-110	**Lubricant,** for fan motor bearings. For price see entry in List No. sequence.			

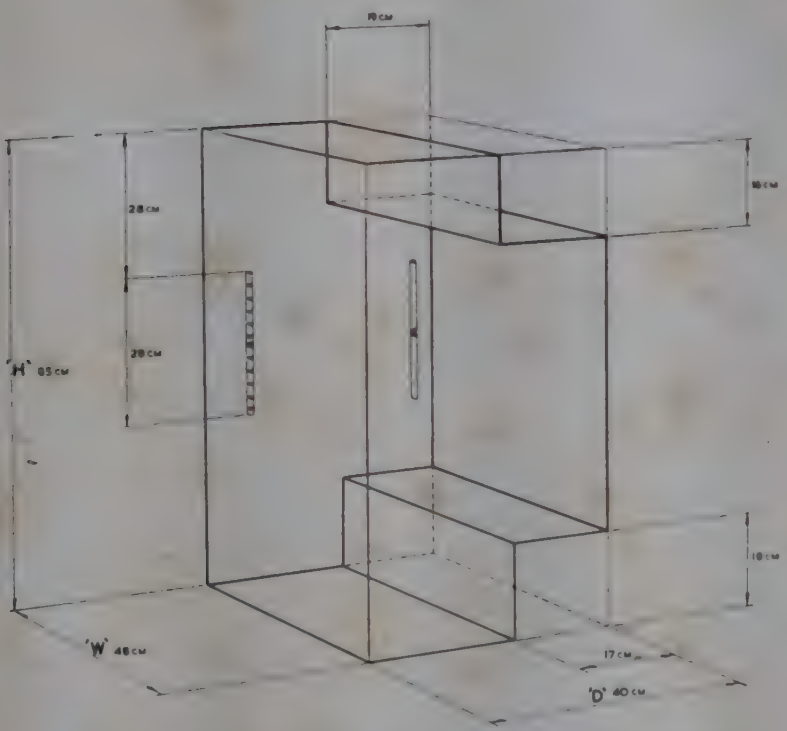


Diagram showing internal shape and dimensions of Cooled Incubator.

IH-332

COOLED INCUBATOR FOR INCUBATION IN CO_2

A modified version of IH-330 for incubations in CO_2 enriched atmospheres. An inlet tubulure at the rear of the control box provides a means of admitting CO_2 or air/CO_2 mixtures and a similar outlet tubulure is provided for monitoring CO_2 concentration. A 6 mm thick inner Perspex door minimises atmosphere loss when the outer door is opened to inspect samples. A dial temperature indicator range 0 to 50°C is fitted to the inside of the inner door.

PERFORMANCE AND DIMENSIONS as IH-330.

IH-340

INCUBATOR, COOLED, *Gallenkamp*, for incubations in CO_2 enriched atmospheres, as IH-330 but fitted with gas inlet and outlet tubulures, dial temperature indicator range 0 to 50°C and unsealed inner Perspex door. **Without integral dial thermometer in the main door.** For 220/240V 50 Hz single phase supplies.
Each **£142. 0. 0.** *g*

When ordering please state voltage and nature of supply.

REPLACEMENTS AND ACCESSORIES see under **IH-332.**

All items on this page normally available from stock.

Gallenkamp SHAKING

- Thermostatic control up to 80°C
- Variable shaking speeds to 200/min.
- Variable stroke length
- Stainless steel construction

IH-350 with
IH-352 and WF-404

PERFORMANCE

Temperature range

Without cover	Ambient† to 50°C
With cover	Ambient† to 80°C

(† For operation near or below ambient temperature the cooling coil must be fitted and supplied with cold water.)

Temperature fluctuation 0·1°C

Stroke lengths	12·5, 25 or 38 mm
Shaker speed	Continuously variable from 50/min to maxima as follows:

Stroke	Max. speed
12·5 mm ...	200/min
25 mm ...	140/min
38 mm ...	100/min

DIMENSIONS

	H	W	D
Overall	22 ×	50 ×	35 cm
	8½ ×	19½ ×	14 in
Bath interior	16 ×	35 ×	30 cm
	6½ ×	14 ×	12 in
Rack size		28 ×	23 cm
		11 ×	9 in
Power rating, max.	500W		

SHAKING REACTION INCUBATOR

- Bath capacity 15 litre
- Maximum container capacity 1 litre
- Compenstat control to within 0·1°C
- Airtight covers for anaerobic working

IH-350

INCUBATOR, SHAKING REACTION, *Gallenkamp*, comprising stainless steel water bath, thermostatically controlled by direct reading *Compenstat*, heated by a 500W metal-sheathed element and with rack carriage and drive motor with speed control having an OFF position. Includes mains switch and load indicator lamp. **Without racks, covers or other accessories.** For single phase supplies.

For 220/240V 50 Hz	Each	**£102. 0. 0.**	*b*
For 200/210V 50 Hz	Each	**£102.10. 0.**	*bN*
For 110/120V 60 Hz	Each	**£102.10. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PART

WF-402 Heater, 500W. For details and price see entry in List No. sequence.

ACCESSORIES

SAMPLE CONTAINER RACKS, stainless steel.

List No.	Type of container	Capacity of container	No. of containers	Each	
IH-352	Conical flasks or beakers	25 ml	20	**£3. 7. 6.**	b
IH-354	Conical flasks	50 ml	10	**£2. 18. 0.**	b
IH-355	" "	100 ml	8	**£4. 15. 0.**	b
IH-357	" "	150 ml	6	**£3. 17. 6.**	b
IH-358	" "	250 ml	4	**£3. 6. 0.**	b
IH-359	Test tubes	125 × 16 mm	48	**£5. 2. 6.**	b

IH-360 **Cover, gabled, stainless steel,** covering entire bath. **Not airtight** ... ... Each **£9. 2. 6.** b

IH-362 **Cover, gabled, stainless steel,** covering half rack (two may be fitted) and forming airtight water seal. With gas tubulure, for **anaerobic** working ... Each **£5. 7. 6.** b

WF-404	**Cooling coil**	For prices see entries in List No. sequence.
WF-406	**Thermometer holder**	
IH-110	**Thermometer,** scale span 10°C to 60°C...	
TJ-440	**Thermometer,** scale span 0°C to 110°C...	
MK-055	**Beaker,** 25 ml	
BJ-625	**Beaker,** 50 ml	
FJ-050	**Flasks,** conical, 25, 50, 100, 150 and 250 ml.	
TF-180	**Test tube,** 125 × 16 mm (5 × ⅝ in) ...	

Items on this page normally available from stock except those coded *N*.

REACTION INCUBATORS

- **Applications include :**
  Shaken culture techniques
  Chemical and biological reactions
  Reaction kinetics studies

SHAKING REACTION INCUBATOR

- **Bath capacity 70 litre**
- **Maximum container capacity 10 litre**
- **Up to 65 samples simultaneously shaken**
- **Contact thermometer control to within 0·2°C**

IH-370

INCUBATOR, SHAKING REACTION, *Gallenkamp*, comprising stainless steel water bath, thermostatically controlled by adjustable contact thermometer in conjunction with a 3-heat power switch, heated by two 1 kW metal-sheathed elements, with rack carriage, drive motor and speed control having an OFF position. With mains and load indicator lamps. **Without racks, cover or other accessories.** For single phase supplies.

For 220/240V 50 Hz	Each **£185. 0. 0.**	*b*
For 200/210V 50 Hz	Each **£189. 0. 0.**	*bN*
For 110/120V 60 Hz	Each **£189. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

WF-472	**Heater, 1000W, inner** ...	For details and prices see entries in List No. sequence.
WF-474	**Heater, 1000W, outer** ...	
TM-866	**Contact thermometer, 0–100°C**	

ACCESSORIES

SAMPLE CONTAINER RACKS, stainless steel.

List No.	Type of container	Capacity of container	No. of containers	Each	
IH-378	Conical flasks	50 ml	65	**£23. 10. 0.**	*b*
IH-380	" "	100 ml	45	**£19. 10. 0.**	*b*
IH-382	" "	250 ml	25	**£15. 15. 0.**	*b*
IH-384	" "	500 ml	20	**£13. 7. 6.**	*b*

IH-390	**Cover, gabled, stainless steel, covering entire bath. Not airtight**	Each **£14. 12. 6.**	*b*
IH-392	**Cooling coil**	Each **£8. 15. 0.**	*b*

IH-110	**Thermometer, 10–60°C** ...	For details and prices see entries in List No. sequence.
TJ-440	**Thermometer, 0–100°C** ...	
FJ-050	**Flasks, 50, 100, 250 and 500 ml**	

IH-370

PERFORMANCE

Temperature range	
Without cover	Ambient† to 50°C
With cover	Ambient† to 80°C

(† For operation near or below ambient temperature the cooling coil must be fitted and supplied with cold water).

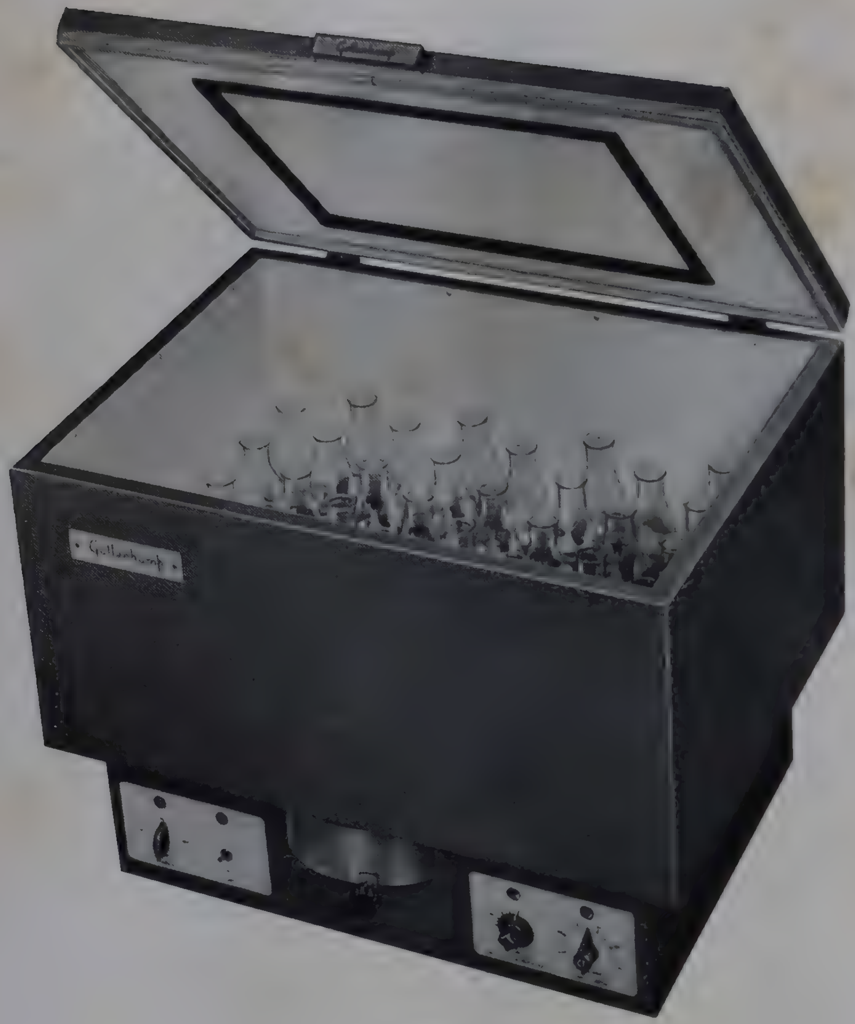
Temperature fluctuation	0·2°C
Stroke lengths	6, 12, 19, 25, 31 or 38 mm
Shaker speed	Variable in ten steps from 20 to 200/min, depending upon stroke length and loading. Load diagram on control panel shows maximum speed for each load and stroke.

DIMENSIONS

		H	W	D
Overall		37 ×	84 ×	56 cm
		14½ ×	33 ×	22 in
Bath interior		28 ×	60 ×	46 cm
		11 ×	24 ×	18 in
Rack size			53 ×	43 cm
			21 ×	17 in
Depth of water above rack	max.	20 cm (8 in)		
	min.	2·5 cm (1 in)		
Power rating, max.		2000W		

Items on this page normally available from stock except those coded *N.*

Gallenkamp ORBITAL



IH-400

For growing cultures of micro-organisms and tissue cells under controlled conditions of temperature and agitation. Applications in microbiology, botany, zoology, virology, bacteriology, biochemistry and metallurgy. Designed in consultation with Professor S. J. Pirt, Microbiology Department, Queen Elizabeth College, London.

- **Maximum container capacity 24 litres**
- **Up to 36 samples simultaneously incubated**
- *Compenstat* **control within ±0·5°C**
- **Built-in safety thermostat**
- **Reliable operation over long periods unattended**
- **Stepless speed control**

PERFORMANCE

Temperature range:	5°C above ambient to 50°C
Temperature fluctuation of samples:	less than 0·1°C
Temperature variation of samples:	±0·5°C max.
Diameter of orbit:	32 mm
Orbiting speeds:	140–280/min stepless 75–150/min 30– 60/min
Capacity:	36×250 ml conical flasks 28×500 ml conical flasks 18×1 litre conical flasks 12×2 litre conical flasks

DIMENSIONS

	H		W		D	
Overall	71	×	81	×	66	cm
	28	×	32	×	26	in
Internal	35·5	×	76	×	56	cm
	14	×	30	×	22	in
Platform			68·5	×	48	cm
			27	×	19	in
Window			48	×	39·5	cm
			19	×	15½	in

Weight, net	86 kg (190 lb)
Power rating, max.	750W

OPERATION

Shaking action. The platform moves with a circular orbital motion which minimises the accretion of material on the sides of the flasks. The speed of this motion can be regulated in order to control the transfer of oxygen (or other gases) between the gaseous and liquid phases and hence the absorption of these gases by the tissues. The driving motor is a 1/20 hp brushless induction motor with permanently lubricated bearings.

Temperature. Thermostatic control by *Compenstat* ensures accurate and uniform temperature throughout the incubator. Thermometer clips are fixed to the underside of the incubator lid so that a thermometer when fitted can be read through the window without disturbing the incubator conditions. To protect cultures from overheating as the result of incorrect setting of the *Compenstat* or a fault condition, an adjustable safety thermostat is fitted.

Atmosphere. The incubator is normally used for growth in air but the counterbalanced lid is fitted with a magnetic gasket and a tubulure is inserted in the cabinet wall in order that other atmospheres may be introduced.

CONSTRUCTION

Long term reliability and quiet running result from the platform being mounted on accurately aligned double row rigid ball journals. The incubator is heated by an efficient hot air circulating system and the absence of water as a heating medium means that 'topping up' is avoided and the apparatus can be left unattended as long as is necessary.

Flasks up to 2 litre capacity may be mounted on the platforms, there being 35 cm clearance between the platform and the cover. The window in the cover is a toughened glass, double glazed, sealed unit which reduces heat losses and positively prevents the view of the interior being obscured by condensed moisture. The inner surfaces of the incubator are finished in resistant, easily cleaned white epoxy enamel.

INCUBATORS

IH-400

INCUBATOR, ORBITAL, *Gallenkamp*, as specification, a circulated heated air incubator with *Compenstat* control, counterbalanced lid with double glazed window and magnetic gasket, orbital drive mechanism giving speed range 140–280/min with stepless speed control and safety thermostat. **Without thermometer. Requires but does not include flask platform** (see below). For 220/240V 50 Hz single phase supplies.

Each **£305. 0. 0.** *b*

IH-402

INCUBATOR, ORBITAL, *Gallenkamp*, as IH-400 but orbiting speed range 75–150/min. **Without thermometer. Requires but does not include flask platform** (see below). For 220/240V 50 Hz single phase supplies ... ... Each **£310. 0. 0.** *bN*

IH-404

INCUBATOR, ORBITAL, *Gallenkamp*, as IH-400 but orbiting speed range 30–60/min. **Without thermometer. Requires but does not include flask platform** (see below). For 220/240V 50 Hz single phase supplies ... ... Each **£310. 0. 0.** *bN*

Available for other voltages and frequencies to special order.

When ordering please state voltage and nature of supply.

ACCESSORIES

Platforms with clips to accept conical flasks:

List No.	For flasks capacity (ml)	Base dia. mm	No. of positions	Each £ s. d.	
IH-410	250	86	36	19. 0. 0.	*b*
IH-414	500	101	28	19. 0. 0.	*b*
IH-418	1000	130	18	19. 0. 0.	*b*
IH-422	2000	160	12	28. 0. 0.	*b*

TJ-070 **Thermometer No. 1,** Standard A, range −5 to 50°C in 0·2°C subdivisions. For full details and price see entry in List No. sequence.

ORBITAL INCUBATOR WITH INTERIOR ILLUMINATION AND REFRIGERATION

For growing cultures of micro-organisms and tissue cells under controlled conditions of agitation and illumination, at temperatures below or above ambient.

A modified version of the standard Orbital Incubator incorporating interior fluorescent illumination and a refrigeration system.

The interior of the incubator is uniformly illuminated by seven 'daylight' fluorescent tubes mounted on the underside of the hinged lid. A reflector is fitted behind the tubes and a Perspex sheet is positioned between the tubes and the working space. **No window is fitted in the cover** but an air blower is mounted on it to cool the tubes.

The cooling coil fitted below the flask platform support is supplied with refrigerant from a refrigerator which, together with individual switches for each of the fluorescent tubes and the ON/OFF switch for the air blower, is contained in a free-standing control box.

IH-450

TECHNICAL DATA

Power rating of each fluorescent tube	30W
Power rating of refrigerator	1/6 hp
Minimum temperature with illumination	10°C below ambient
Minimum temperature without illumination	20°C below ambient
Maximum temperature	50°C

IH-450

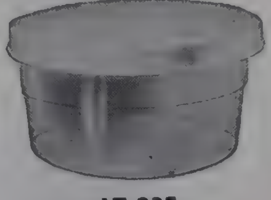
INCUBATOR, ORBITAL, ILLUMINATED AND REFRIGERATED, *Gallenkamp*, as IH-400 but including cover fitted with seven fluorescent lamps, reflector, baffle and air blower but **without window.** Includes cooling coil and combined refrigerator and control box. For 220/240V 50 Hz supplies only. **Requires but does not include flask platform** (see IH-410 to IH-422).

Each **£580. 0. 0.** *b*

ACCESSORIES see under **IH-400.**

Items on this page normally available from stock except those coded *N.*

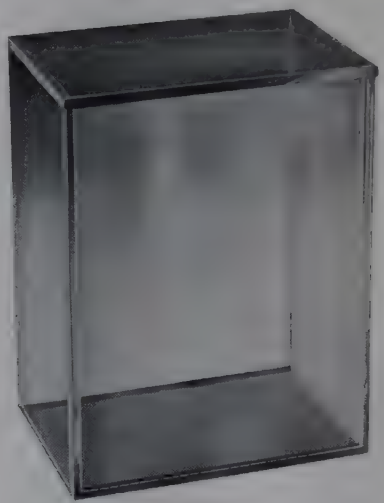
JE-100



JE-235

JE-440

JE-400



JE-520

JARS

JE-100

JARS, battery, borosilicate glass, with ground and bevelled rim.

Capacity approx.	300	900	1200	2000	4000 ml	
Height	125	150	200	225	200 mm	
Dia.	75	100	100	125	175 mm	
Dozen	**109/-**	**122/-**	**170/-**	**264/-**	**183/3**	d
Each	**10/-**	**11/3**	**15/7**	**24/2**	**16/9**	

JE-235

JARS, polystyrene, taper sided with extra wide mouth and airtight, close fitting white polythene lids.

Capacity	20	35	85	180	280	360 ml	
Height	25	35	35	75	85	110 mm	
Top dia.	40	45	68	68	82	82 mm	
Gross	**44/-**	**49/-**	**68/-**	**80/-**	**104/-**	**120/-**	c
Dozen	**5/-**	**5/6**	**6/10**	**7/10**	**9/6**	**11/-**	

JE-400

JARS, specimen, borosilicate glass, internal dia. 8 cm, with foot and ground-in flat top stopper.

Capacity approx.	250	500	750	1250 ml	
Height	10	15	20	30 cm	
Dozen	**119/-**	**154/-**	**178/-**	**251/-**	d
Each	**11/-**	**14/3**	**16/6**	**23/-**	

JE-440

JAR, specimen, soda-lime glass, 25 cm high, 20 cm dia. with drop-on lid and knob. Capacity approx. 700 ml.
Dozen **£21. 0. 0.** Each **£1. 18. 0.** c

JE-520

JARS, specimen, Perspex, rectangular, polished flat surfaces on all sides. With cover.

Height	5	10	15	17·5 cm	
Width	5	7·5	10	12·5 cm	
Depth	2·5	5	5	10 cm	
Dozen	**74/-**	**114/-**	**155/-**	**295/-**	m
Each	**7/4**	**10/3**	**14/-**	**27/-**	
Height	20	22·5	25	30 cm	
Width	15	15	15	20 cm	
Depth	10	7·5	10	10 cm	
Dozen	**350/-**	**340/-**	**400/-**	**540/-**	m
Each	**32/-**	**31/-**	**36/-**	**49/-**	

PP-624

PERSPEX SHEET, suitable for cutting mounting plates for jars JE-520 see details in List No. sequence.

BT-220
JARS, (Bottles) polythene, extra wide neck.
BT-225
JARS, (Bottles) rigid polythene, extra wide neck, square shape.
BT-265
JARS, (Bottles) glass, extra wide neck.
BT-280
JARS, (Bottles) glass, extra wide neck, square shape.
BT-290
JARS, (Bottles), Kilner.
GD-250
GAS COLLECTING JARS, with ground flange.
HT-500
HYDROMETER TRIAL JARS, glass.
HT-520
HYDROMETER TRIAL JARS, polythene.
For details of above items see entries in List No. sequence.

All items on this page normally available from stock.

INTERCHANGEABLE GLASS JOINTS QUICKFIT AND CLEARFIT

TO BS 572

JR-010

CONE JOINTS, *Quickfit*, plain end, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Three	Each	
5/13	4	CNB5	57/–	15/–	6/–	m
7/16	7	CNB7	49/–	13/–	5/6	m
10/19	9	CNB10	46/–	12/3	5/4	m
12/21	12	CNB12	46/–	12/3	5/4	m
14/23	14	CNB14	43/–	11/3	5/–	m
19/26	18	CNB19	46/–	12/3	5/4	m
24/29	23	CNB24	51/–	13/6	5/8	m
29/32	28	CNB29	58/–	15/6	6/2	m
34/35	33	CNB34	65/–	17/–	6/9	m
40/38	39	CNB40	81/–	21/6	7/10	m
45/40	44	CNB45	97/–	25/6	9/–	m
50/42	49	CNB50	103/–	27/–	9/6	m

JR-012

CONE JOINTS, *Clearfit*, plain end, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Three	Each	
14/23	14	KCNB14	75/–	19/6	7/4	m
19/26	18	KCNB19	84/–	22/–	8/–	m
24/29	23	KCNB24	89/–	23/6	8/6	m
29/32	28	KCNB29	94/–	24/6	8/9	m

JR-020

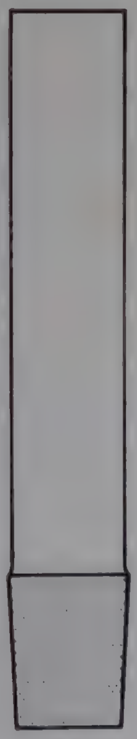
CONE JOINTS, *Quickfit*, plain end with hooks, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Three	Each	
10/19	9	CHB10	62/–	16/6	6/6	m
14/23	14	CHB14	59/–	15/6	6/2	m
19/26	18	CHB19	62/–	16/6	6/6	m
24/29	23	CHB24	67/–	17/6	6/10	m

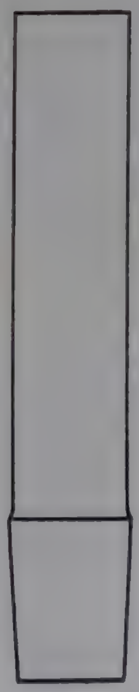
The properties of *Quickfit* ground glass joints are too well known to require introduction.

Clearfit conical glass joints are manufactured by a new process which achieves a fine precision fit without the necessity of grinding. This provides the following advantages:

- **Greater strength**
- **Reduced leakage and creep**
- **Less contamination, easier cleaning**
- **Greasing rarely necessary**
- **Reduced seizing or sticking**
- **Reduced alkali attack**
- **Transparent for internal observation**
- **Interchangeable with ground joints**



JR-010



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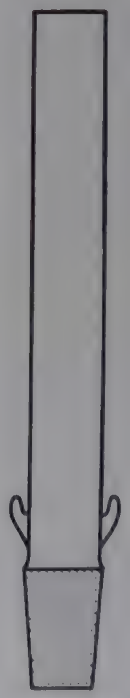
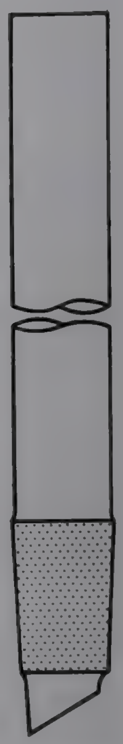


JR-020

All items on this page normally available from stock.

QUICKFIT AND CLEARFIT JOINTS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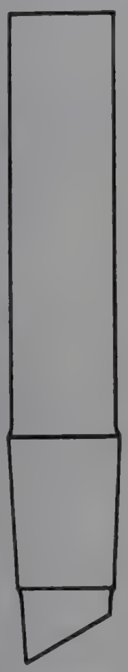
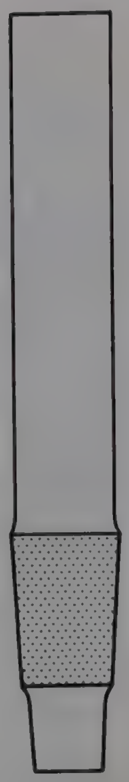

JR-032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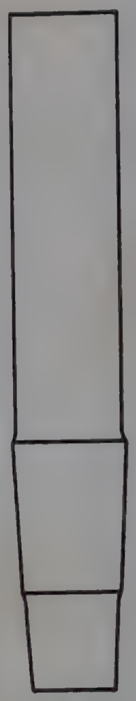
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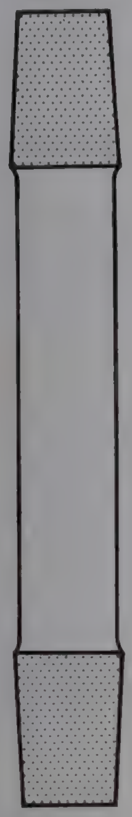

JR-040

JR-030

CONE JOINTS, *Quickfit*, angle drip end, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Three	Each	
10/19	9	CAB10	**59/–**	**15/6**	**6/2**	*m*
14/23	14	CAB14	**54/–**	**14/3**	**5/10**	*m*
19/26	18	CAB19	**57/–**	**15/–**	**6/–**	*m*
24/29	23	CAB24	**65/–**	**17/–**	**6/8**	*m*
29/32	28	CAB29	**70/–**	**18/6**	**7/–**	*m*
34/35	33	CAB34	**78/–**	**20/6**	**7/8**	*m*

JR-032

CONE JOINTS, *Clearfit*, angle drip end, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Three	Each	
14/23	14	KCAB14	**86/–**	**22/6**	**8/3**	*m*
19/26	18	KCAB19	**103/–**	**27/–**	**9/6**	*m*
24/29	23	KCAB24	**108/–**	**28/6**	**10/–**	*m*
29/32	28	KCAB29	**113/–**	**29/–**	**10/6**	*m*

JR-035

CONE JOINTS, *Quickfit*, long tip, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Three	Each	
7/16	7	CBB7	**62/–**	**16/6**	**6/6**	*m*
10/19	9	CBB10	**54/–**	**14/3**	**5/10**	*m*
14/23	14	CBB14	**49/–**	**13/–**	**5/6**	*m*
19/26	18	CBB19	**51/–**	**13/6**	**5/8**	*m*
24/29	23	CBB24	**57/–**	**15/–**	**6/–**	*m*
29/32	28	CBB29	**59/–**	**15/6**	**6/2**	*m*
34/35	33	CBB34	**67/–**	**17/6**	**6/10**	*m*
40/38	39	CBB40	**84/–**	**22/–**	**8/–**	*m*
45/40	44	CBB45	**103/–**	**27/–**	**9/6**	*m*

JR-037

CONE JOINTS, *Clearfit*, long tip, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Three	Each	
14/23	14	KCBB14	**81/–**	**21/6**	**7/10**	*m*
19/26	18	KCBB19	**94/–**	**24/6**	**8/9**	*m*
24/29	23	KCBB24	**103/–**	**27/–**	**9/6**	*m*
29/32	28	KCBB29	**108/–**	**28/6**	**10/–**	*m*

JR-040

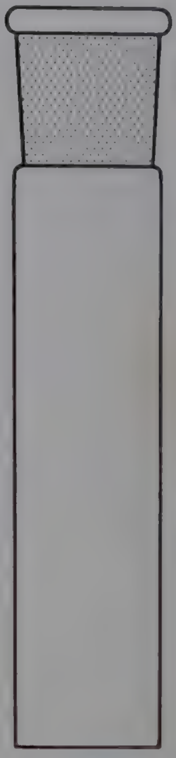
CONE JOINTS, *Quickfit*, double cone, plain ends, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Three	Each	
10/19	9	CND0/50	**84/–**	**22/–**	**8/–**	*m*
14/23	14	CND1/80	**78/–**	**20/6**	**7/8**	*m*
19/26	18	CND2/80	**84/–**	**22/–**	**8/–**	*m*
24/29	23	CND3/95	**92/–**	**24/6**	**8/9**	*m*
34/35	33	CND5/150	**116/–**	**31/–**	**11/–**	*m*

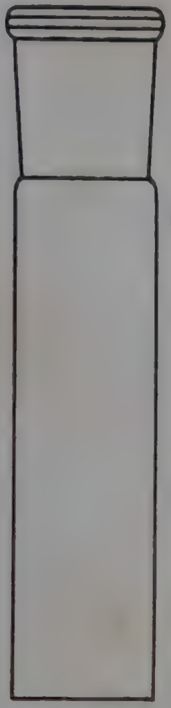
All items on this page normally available from stock.

QUICKFIT AND CLEARFIT SOCKET JOINTS

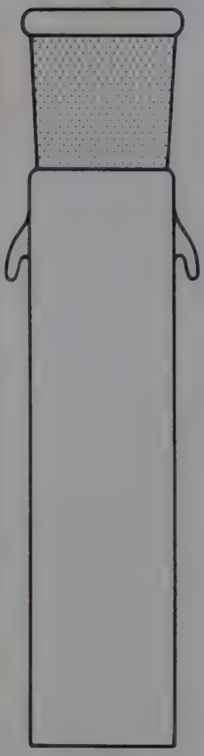
TO BS 572



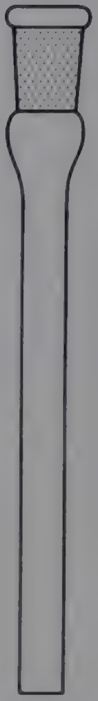
JR-080



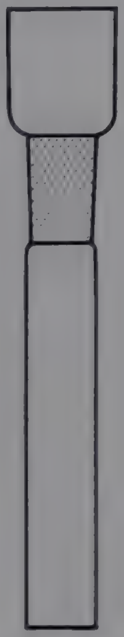
JR-082



JR-090



JR-095



JR-105

JR-080

SOCKET JOINTS, *Quickfit*, plain shoulder, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Three	Each	
7/16	11	SRB7	65/–	17/–	6/8	m
10/19	14	SRB10	51/–	13/6	5/8	m
12/21	15	SRB12	51/–	13/6	5/8	m
14/23	18	SRB14	46/–	12/–	5/2	m
19/26	23	SRB19	46/–	12/–	5/2	m
24/29	28	SRB24	51/–	13/6	5/8	m
29/32	33	SRB29	62/–	16/6	6/6	m
34/35	40	SRB34	70/–	18/6	7/–	m
40/38	46	SRB40	84/–	22/–	8/–	m
45/40	52	SRB45	103/–	27/–	9/6	m
50/42	56	SRB50	119/–	31/–	10/9	m

JR-082

SOCKET JOINTS, *Clearfit*, plain shoulder, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Three	Each	
14/23	18	KSRB14	75/–	19/6	7/4	m
19/26	23	KSRB19	81/–	21/6	7/10	m
24/29	28	KSRB24	89/–	23/6	8/6	m
29/32	33	KSRB29	94/–	24/6	8/9	m

JR-090

SOCKET JOINTS, *Quickfit*, plain shoulder with hooks, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Three	Each	
10/19	14	SHB10	67/–	17/6	6/10	m
14/23	18	SHB14	62/–	16/6	6/4	m
19/26	23	SHB19	62/–	16/6	6/4	m
24/29	28	SHB24	67/–	17/6	6/10	m

JR-095

SOCKET JOINTS, *Quickfit*, bulged shoulder, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Three	Each	
5/13	6	SBB5	94/–	25/–	8/9	m
7/16	7	SBB7	94/–	25/–	8/9	m
10/19	10	SBB10	76/–	20/–	7/6	m
14/23	14	SBB14	59/–	15/6	6/2	m
19/26	19	SBB19	65/–	17/–	6/8	m
24/29	23	SBB24	65/–	17/–	6/8	m
29/32	28	SBB29	67/–	17/6	6/10	m
34/35	33	SBB34	81/–	21/6	7/10	m

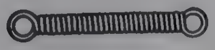
JR-105

SOCKET JOINTS, *Quickfit*, plain shoulder with cup, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Six	Each	
10/19	15	SCB10	60/6	11/3	m
14/23	19	SCB14	65/–	12/–	m
19/26	25	SCB19	70/–	13/–	m
24/29	29	SCB24	78/6	14/6	m

All items on this page normally available from stock.

JOINT SPRINGS

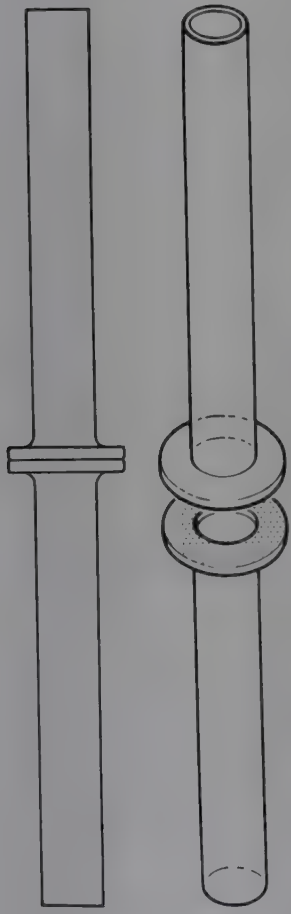


JR-140

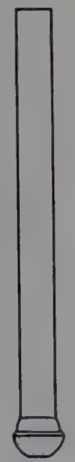
JR-140

SPRINGS, for use on joints with hooks.

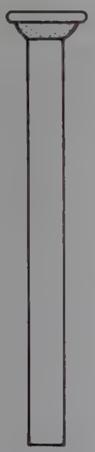
Ref. No.	MF40	MF40A	MF40B	
Length	25	38	50 mm	
For joints from	7/16	14/23	40/38	
to	12/21	34/35	55/44	
Dozen packs	**48/–**	**48/–**	**72/–**	*m*
Pack of 12	**5/–**	**5/–**	**7/–**	



2 Joints FG10
JR-180



JR-250



JR-255

CARE OF GROUND GLASS JOINTS

A thin film of PTFE applied to ground joints by spraying with aerosol provides efficient lubrication. It reduces the danger of seizure and in some cases avoids the need of grease for sealing.

See **LX-245 PTFE AEROSOL** under **LUBRICANTS**

For best results the film should be evenly deposited, and for this purpose the joint should be slowly rotated at steady speed whilst the aerosol is applied. Any available tool from a hand drill to a glass working lathe may advantageously be used.

QUICKFIT FLAT FLANGE JOINTS

JR-180

FLAT FLANGE JOINTS, *Quickfit,* interchangeable borosilicate glass, for high vacuum work.

Nominal bore, mm	Approx. flange dia., mm	Ref. No.	Six	Each	
2	20	FG2	**75/6**	**14/–**	*m*
5	25	FG5	**78/6**	**14/6**	*m*
10	30	FG10	**83/6**	**15/6**	*m*
15	45	FG15	**96/–**	**17/9**	*m*
25	55	FG25	**108/–**	**20/–**	*m*
35	75	FG35	**137/6**	**25/6**	*m*
50	85	FG50	**183/6**	**34/–**	*m*

QUICKFIT SPHERICAL JOINTS

TO BS 2761

JR-250

BALL JOINTS, *Quickfit,* borosilicate glass, interchangeable inner portions of spherical joints, designed to avoid rigidity rather than to allow appreciable deflection.

Nominal bore, mm	Ref. No.	Dozen	Each	
2	MS13C	**92/–**	**8/6**	*m*
5	MS13	**92/–**	**8/6**	*m*
9	MS19	**100/–**	**9/3**	*m*
15	MS29	**127/–**	**11/9**	*m*
21	MS35	**148/–**	**13/9**	*m*
27	MS41	**162/–**	**15/–**	*m*
35	MS51	**189/–**	**17/6**	*m*

JR-255

CUP JOINTS, *Quickfit,* borosilicate glass, interchangeable outer portions of spherical joints.

Nominal bore, mm	Ref. No.	Dozen	Each	
2	FS13C	**97/–**	**9/–**	*m*
5	FS13	**97/–**	**9/–**	*m*
9	FS19	**103/–**	**9/6**	*m*
15	FS29	**121/–**	**11/3**	*m*
21	FS35	**143/–**	**13/3**	*m*
27	FS41	**163/–**	**15/–**	*m*
35	FS51	**189/–**	**17/6**	*m*

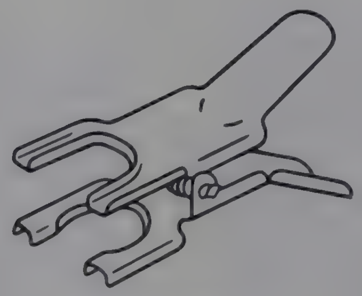
All items on this page normally available from stock.

JOINT CLIPS

JR-260

JOINT CLIPS, *Quickfit*, for holding flat flanges and spherical joints.

To fit ball and cup joint. Size No.	To fit flat flange. Nominal bore mm	Ref. No.	Dozen	Three	Each	
S13	2	JC13	51/-	13/6	5/8	*m*
S19	5	JC19	62/-	16/6	6/4	*m*
S29	10	JC29	62/-	16/6	6/4	*m*
S35	15	JC35	76/-	20/-	7/6	*m*
S41	25	JC41	76/-	20/-	7/6	*m*
			Six			
S51	—	JC51	51/6	—	9/6	*m*
—	50	JC50F	73/-	—	13/6	*m*
—	75	JC75F	78/6	—	14/6	*m*
—	100	JC100F	78/6	—	14/6	*m*


JR-260

NOTE: The above illustration of JR-260 applies to the first 7 sizes. The larger clips are made of stainless steel wire.

JUGS

JV-100

JUGS, enamelled steel, cylindrical, with handle and spout, graduated inside in cc, pt, and fl. oz.

Capacity	¼	½	1	2	5 litre	
Each	8/9	10/3	13/9	20/6	42/-	c

***JV-150**

JUGS, stainless steel, tapered, with handle and spout, graduated inside in litres and decilitres.

Capacity	½	1	2 litre	
Each	13/-	21/6	30/-	*m*

JV 250

JUGS, rigid polypropylene, with spout and handle, graduated in cc and pints.

Capacity	½	1 litre	
Dozen	57/-	84/-	c
Each	6/-	8/-	

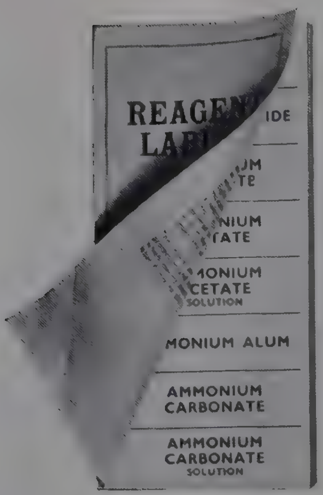
JV-100

JV-150

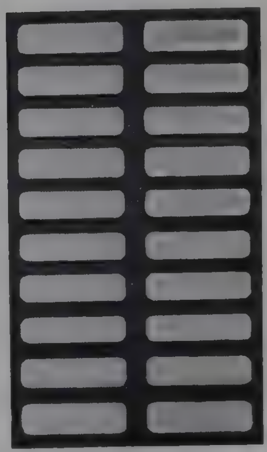
JV-250

KIPPS APPARATUS
see GAS GENERATORS
KJELDAHL APPARATUS
see NITROGEN DETERMINATION
also QUICKFIT APPARATUS
KNIVES,
Cork cutting see CORK ACCESSORIES
Glass cutting see GLASSBLOWING TOOLS
Microtome see MICROTOMES

All items on this page normally available from stock.


REAGE
LAB
IDE
UM
TE
NIUM
TATE
MONIUM
CETATE
SOLUTION
MONIUM ALUM
AMMONIUM
CARBONATE
AMMONIUM
CARBONATE
SOLUTION

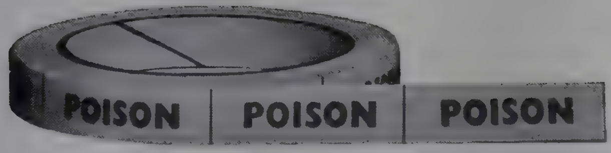
LB-100



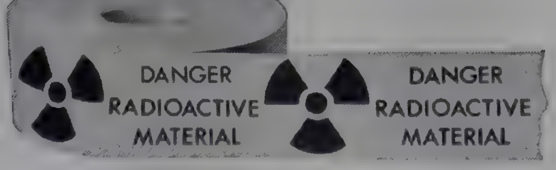
LB-130

RILE
STERILE
STERILE

LB-150


POISON
POISON
POISON

LB-155


DANGER
RADIOACTIVE
MATERIAL
DANGER
RADIOACTIVE
MATERIAL

LB-160

LABELS

LB-100

LABEL BOOK FOR REAGENTS, containing over 300 gummed, varnished and perforated labels, with names.
Dozen books **£3. 10. 0.** Book **£0. 7. 0.** *c*

LB-110

LABELS, blank, gummed paper with black frame, in packs of 100.

Size	63×19	63×25	76×25 mm	
Dozen packs Pack	**19/6** **3/3**	**19/6** **3/3**	**19/6** **3/3**	*c*

Size	82×38	100×38 mm	
Dozen packs Pack	**19/6** **3/3**	**21/6** **3/4**	*c*

LB-120

LABELS, blank, self adhesive white, in special boxes which dispense one label at a time. These labels adhere securely to most materials including plastics.

Size Quantity	12·5×24 1000	23·5×49 mm 500	
Dozen boxes Box	**108/–** **10/–**	**114/–** **10/3**	*c*

LB-130

LABELS, blank, self adhesive white, set out on sheets so that titles may be conveniently typed onto the labels. The labels adhere securely to most materials including plastics. Size 19×24.5 mm is suitable for use on microscope slides.

Size Qty. in box	19×24·5 1000	19×63 500	35×44·5 mm 500	
Dozen boxes Box	**145/–** **13/3**	**120/–** **11/–**	**140/–** **12/9**	*c*

LABELS for microscope slides see also HJ-830 and HJ-833 in List No. sequence.

LB-140

LABELLING TAPE, cellulose, opaque, self adhesive with special white surface for writing on. In rolls of 65 metres.

Tape width	19	25 mm	
Dozen rolls Roll	**130/–** **11/9**	**180/–** **16/6**	*m*

LB-150

LABELS, 'STERILE'. Self-adhesive PVC labelling tape with word 'STERILE' printed in blue on white ground. Size 50×12·5 mm wide, in 65 metre rolls.
Dozen rolls **£7. 0. 0.** Roll **£0. 12. 9.** *m*

LB-155

LABELS, 'POISON'. Self-adhesive PVC labelling tape with word 'POISON' printed in red on white ground. Size 50×12·5 mm wide, in 65 metre rolls.
Dozen rolls **£7. 0. 0.** Roll **£0. 12. 9.** *m*

LB-160

WARNING TAPE, self-adhesive, PVC, legend 'Danger —Radioactive Material' with international radioactivity symbol in yellow and red. Size 70×25 mm, in 65 metre rolls ... Dozen rolls **£10. 5. 0.** Roll **£0. 18. 6.** *c*

All items on this page normally available from stock.

LAMPS

***LH-250**

LAMP, low voltage, extending arm. A compact adjustable wall or bench lamp with 12V, 21W bulb. A heavy base houses a mains transformer and OFF/DIM/BRIGHT switch and confers stability to the lamp even when the 40 cm telescopic arm is extended. Dimensions 17×7×6·5 cm when closed. For 220/240V a.c. single phase supplies only ... ... Each **£5. 1. 0.** *m*

LH-300

LAMP, *Anglepoise*, cream enamel finish, giving concentrated light at any angle. With 75 cm long arm, adjustable to any position, and table base. For use with 40W B.C. fitting bulb. **Without bulb** ... Each **£5. 8. 1.** *m*

LH-305

LAMP, counterpoised, of sturdy design for desk or bench use. Cream finish, giving concentrated light at any angle. A 60 cm reach, with rolling weight counterpoised action giving perfect adjustment even on a sloping surface. With table base. For use with 40 to 100W B.C. fitting bulb. **Without bulb** ... ... Each **£5. 15. 6.** *m*

LH-330

LAMP, fluorescent, for bench mounting. With two 30 cm tubes in reflector housing fully adjustable in all directions. Flexible 'stayput' arm mounted on control unit and heavy base. Consumption 20W with light output equivalent to 75W tungsten lamp. Finished stove enamel and chromium plate. For 230/250V a.c. supplies. Each **£9. 7. 10.** *m*

Models for 100/115 and 200/220V available to special order.

REPLACEMENT PART

LH-332 Fluorescent tube ... ... Each **£0. 9. 0.** m

LH-250

LH-300

LH-305

LH-330

DISCHARGE LAMPS

LH-400

SODIUM LAMP, *Gallenkamp*. A robust, brilliant source suitable for spectroscopy, polarimetry, refractometry and interferometry. Comprises a 45W sodium discharge tube, housed in a metal shield with a 2·5 cm dia. aperture and mounted by means of a bosshead on the alloy rod at the rear of the control box. The transformer and ON/OFF switch are mounted within the control box which provides a stable base for the assembly. For 200/250V a.c. supplies ... ... Each **£23. 0. 0.** *b*

REPLACEMENT PART

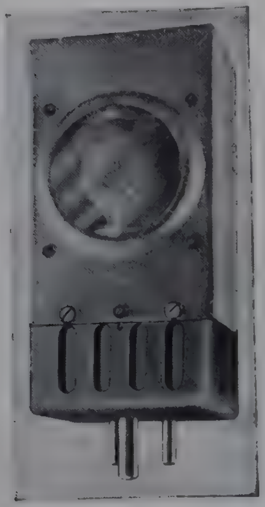
LH-402 Sodium discharge tube, 45W ... Each **£3. 0. 0.** m

LH-400

All items on this page normally available from stock.

DISCHARGE LAMPS

(continued)



LH-440

LH-440

MERCURY LAMP. A 250W high pressure mercury vapour discharge tube providing a small but extremely bright source of light suitable for photomicrography and fluorescent microscopy. The spectrum is that of mercury at high pressure, the principle wavelengths being 3650Å (ultraviolet), 4046Å (violet), 4358Å (blue), 5460Å (green) and 5790Å (yellow). Discharge takes place in a silica sphere mounted inside a metal shield fitted with a circular glass window. The lamp must be operated vertically with the base down and requires but does not include choke LH-445 to limit the current to the correct value when operating on a.c. supplies. Fitted with standard 5A 3-pin plug. For 200/250V a.c. or d.c. supplies.

Each **£25. 0. 0.** *m*

LH-445

CHOKE, for use with lamp LH-440 on 200/250V 50 Hz supplies ... ... Each **£5. 15. 0.** *m*

When ordering please state voltage and nature of supply.

VARIABLE SOURCE SPECTRUM OUTFIT

LH-47υ with discharge tube

Comprises a basic stand and power supply transformer box for a range of gas-filled discharge tubes each of which emits light at a number of known wavelengths.

APPLICATIONS

- Interferometry.
- Refractometry.
- Polarimetry.
- Spectroscopy.

LH-470

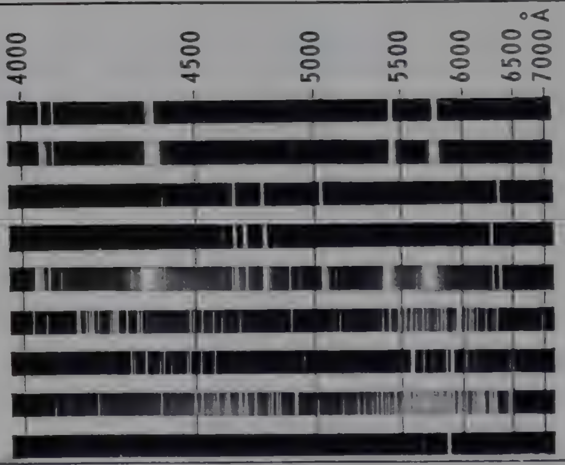
STAND/POWER SUPPLY ASSEMBLY, comprising discharge tube holder and shield mounted on an adjustable stand and a separate transformer box with ON/OFF switch. Suitable for use with but **not including discharge tubes LH-474 to LH-495 listed below.** For 200/250V 50 Hz single phase supplies.

Each **£27. 5. 0.** *m*

SPECTRAL DISCHARGE TUBES

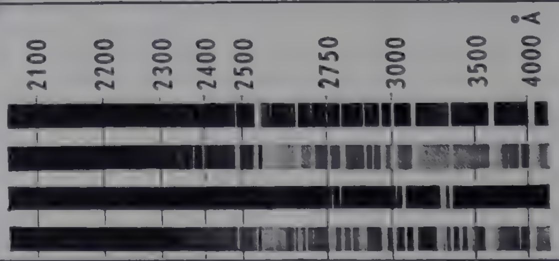
FOR VISIBLE SPECTRA Tubes with glass envelopes.

List No.	Gas or vapour	Wattage	Arc length mm	Each	
***LH-474**	Hg (low pressure)	15	40	**£4. 4. 0.**	*m*
***LH-475**	Hg (high pressure)	90	30	**£10. 18. 6.**	*m*
***LH-476**	Cd	25	30	**£10. 18. 6.**	*m*
***LH-477**	Zn	25	30	**£10. 18. 6.**	*m*
***LH-478**	Hg, Cd, Zn	90	30	**£10. 18. 6.**	*m*
***LH-479**	A	15	40	**£4. 4. 0.**	*m*
***LH-480**	Kr	15	40	**£4. 4. 0.**	*m*
***LH-481**	Xe	10	40	**£4. 4. 0.**	*m*
***LH-482**	Na	15	40	**£4. 4. 0.**	*m*



FOR ULTRAVIOLET SPECTRA Tubes with quartz envelopes.

List No.	Gas or vapour	Wattage	Arc length mm	Each	
***LH-492**	Hg (low pressure)	15	40	**£18. 0. 0.**	*m*
***LH-493**	Hg (high pressure)	90	30	**£18. 0. 0.**	*m*
***LH-494**	Zn	25	30	**£18. 0. 0.**	*m*
***LH-495**	Hg, Cd, Zn	90	30	**£18. 0. 0.**	*m*



Gallenkamp ULTRAVIOLET DISCHARGE LAMP FOR 3650 Å

The 125W mercury discharge tube is enclosed in an ultraviolet glass filter from which there is practically no visible light, 95% of the radiation being at 3650 Å. The assembly is housed in an anodised aluminium reflector, mounted on an easily adjustable arm. The arm is pivoted from a metal case which houses a multitapped choke, making the whole a self-contained and portable unit. A carrying handle is fitted to the top of the case. External finishes are stoved enamel and chromium plate. The lamp is normally supplied with a voltage range of 200/250V 50 Hz only. Voltage tappings are provided in 5V steps, **and the exact supply voltage should be stated when ordering,** so that the equipment can be supplied in correct adjustment. The net weight of the complete lamp is 7 kg.

LH-530

LH-530

LAMP, ultraviolet, *Gallenkamp*, portable, as specification, with peak output at 3650 Å. Consisting of 125W tube, filter, reflector and adjustable arm mounted on power unit. For 200/250V 50 Hz supplies.
Each **£42. 0. 0.** *b*

REPLACEMENT PART
LH-532 **Spare tube, 125W** ... ... Each **£3. 18. 0.** *m*

When ordering please state voltage and nature of supply.

ULTRAVIOLET LAMPS FOR MISCELLANEOUS WAVELENGTHS

LH-535

LAMP, ultraviolet. With two 23 cm low pressure fluorescent tubes in reflector housing with Woods glass UV filter. Peak output at 3650 Å. Fully adjustable in all directions by flexible 'stayput' arm mounted on control unit with heavy 18 cm base. Consumption 20W. Finished stove enamel and chromium plate. For 220/250V 50 Hz supplies ... ... Each **£15. 15. 0.** *f*

REPLACEMENT PART
LH-536 **Spare fluorescent tube** ... ... Each **£0. 12. 0.** *m*

LH-535

LH-540

LAMP, ultraviolet, *Hanovia 'Chromatolite'*, 90% of the output of which is at 2537 Å wavelength. The quartz envelope of the cold cathode discharge tube is bent into a 30 cm long U-form and is mounted in a metal box housing, one side of which incorporates the fluorescence filters. The lamp housing is clipped to one face of the power unit which may be stood on any of the other five faces for irradiation of horizontal or vertical planes or for trans-illumination. In the position illustrated, the lamp box clears the bench by 10 cm. Net weight 6 kg. Power consumption 45W. Lamp life averages about 3000 hours with significant loss of output. For 200/250V 50/60 Hz supplies ... ... Each **£53. 0. 0.** *m*

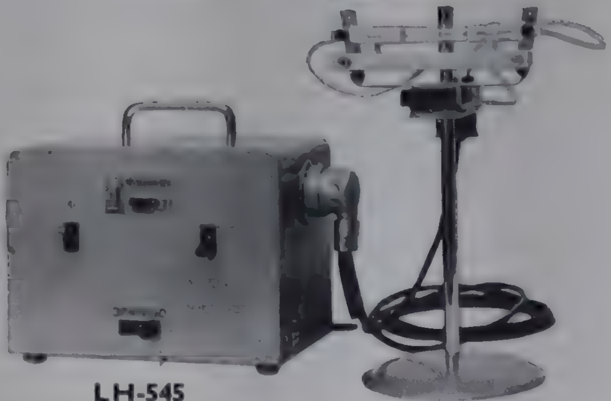
REPLACEMENT PART
LH-542 **Spare tube** ... ... Each **£15. 5. 0.** *m*

LH-540

LH-545

LAMP, ultraviolet, *Hanovia*, incorporating a medium pressure mercury straight arc tube in quartz with an effective length of 44 mm. The principal radiation output is at 3650, 3021, 2972, 2650 and 2537 Å. Normal effective life is 1000 hours. Power consumption 90W. The tube is mounted on a metal backplate fixed to an upright metal stand, with control unit. For 200/250V 50 Hz supplies ... ... Each **£32. 0. 0.** *fN*

REPLACEMENT PART
LH-546 **Discharge tube, straight, in quartz.** Each **£9. 10. 0.** *fN*


LH-545

Items on this page normally available from stock except those coded *N.*

CHROMATOGRAM VIEWING CABINET

LH-600

LH-600

VIEWING CABINET, *Engelhard-Hanovia*, suitable for viewing thin layer and paper chromatograms by transmitted light with the advantage that areas may be measured or traced directly without casting shadows. Incorporates tungsten and ultra-violet light giving very even illumination without shadow. Two sliding filters transmit mainly at 2540 Å and 3660 Å respectively and a sliding shutter is provided for use when contact printing. The viewing aperture is adjustable at 20 × 20 cm and 20 × 5 cm and the top is fitted with guide rails to accept 100 × 20 cm preparative layer chromatograms. Provision is made for viewing by reflected light when necessary and a camera support rod is provided.

Overall dimensions 30 × 30 × 56 cm high. For 200/250V 50 Hz single phase supplies... ... Each **£155. 0. 0.** *f*

D.C. EXCITED GAS LASERS

Compact, reliable sources for use as scientific tools in research and industrial applications, and as an apparatus suitable for educational use. The SL series, intended principally for research and industrial applications consists of a laser and separate power pack; the GP series has an integral power pack.

Discharge tube

The discharge tube is of the Brewster window design and comprises a capillary tube surrounded by a coaxial reservoir of borosilicate glass which houses the cathode and anode assemblies. The gas filling is a high purity 5 : 1 ratio Helium-neon mixture at a total pressure optimised for operation at 632·8 nm; the type SL3 will also operate at 1153 nm or 3390 nm, by the substitution of the appropriate mirrors.

Mirrors

Mirrors are of fused silica, with high reflectivity coatings.

LK-101 to LK-105

Housing

The discharge tube and mirrors are housed in a box structure designed for maximum rigidity and resistance to microphony. To ensure long trouble free life, the spaces between the Brewster windows and the mirrors are sealed under clean conditions.

Output

The output beam is plane polarised and diffraction limited having a diameter at the exit of 1·0 mm. The beam divergence is 0·77 m radian.

Modulation

A socket is provided on each unit to permit amplitude modulation to be applied to the output beam.

Excitation

Excitation at 2 kV (maximum) is provided by the power pack. The dissipation in the discharge tube is normally 15W.

GAS LASERS, d.c. excited, *Ferranti*. **Output at 632·8 nm.** Supplied with operating handbook and, in the case of Models GP1 and GP2, with a handbook of suitable experiments for educational laboratories. For 220/240V 50 Hz single phase supplies.

List No.	Model	Output Power Uniphase—mW (min)	Weight	Each	
LK-101	GP1	0·25	5·2 kg	**£200**	*f*
LK-102	GP2	1·0		**£290**	*f*
LK-103	SL3 *	0·5	Laser—3 kg Power pack—9 kg	**£260**	*f*
LK-104	SL4	1·0		**£290**	*f*
LK-105	SL5	2·5		**£450**	*f*

***NOTES:** Model SL3 to operate at 1153 nm or 3390 nm—price on application.
1 nm is equivalent to 10 Å.

Available for other voltages and frequencies to special order.

LIGHTERS

LV-020

LIGHTER, GAS, battery operated, complete with battery and burner element. Suitable for towns (coal) gas.
Each **£0.15. 9.** *m*

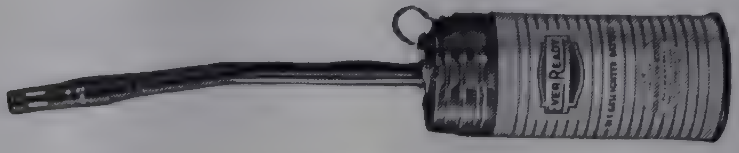
REPLACEMENT PARTS

LV-022 Battery, 1·5V. Type U14 ... Each **£0. 2. 9.** *m*
LV-024 Burner element
Dozen **£1. 2. 0.** Each **£0. 3. 5.** *m*

LV-030

LIGHTER, GAS, flint operated. Suitable for all fuel gases ... ... Dozen **£8. 0. 0.** Each **£0.14. 6.** *m*

LV-032 Flints for above. Pack of 12
Dozen packs **£0.16. 0.** Pack **£0. 2.11.** *m*



LV-020

LV-030

LIQUID DISPENSERS

Various types of apparatus suitable for dispensing liquids will be found under the following headings:

BOTTLES BT-552, BT-580
CARBOY ACCESSORIES CC-932 to CC-945
PIPETTES PM-664 to PM-764
SYRINGES SY-410 to SY-430
BURETTES BW-334, BW-554
MEDICAL SCIENCES ME-230, ME-240
WATER & CHEMICAL PUMPS WM-200

LUBRICATING OILS AND GREASES

LX-100

LUBRICANT, oil, SAE 5W (approx.), an extra light grade machine oil, containing a corrosion inhibitor. In sealed 4 oz (112 g) can with flexible spout.
Dozen **£0.18. 0.** Each **£0. 3. 1.** *m*

LX-110

LUBRICANT, oil, SAE 10, a light grade oil suitable for lubricating sintered bronze bearings on small electric motors, etc. In can with spout containing 10 fl. oz. (284 ml). Dozen **£1.18. 0.** Each **£0. 4. 5.** c

LX-120

LUBRICANT, oil, SAE 10, *Edwards* No. 8A, a straight mineral oil, recommended for rotary vacuum pumps without air ballast.

In can containing approx.	¼ 1	1 gal 4·5 litres	
Each	8/–	17/–	*f*

LX-130

LUBRICANT, oil, SAE 20, *Edwards* No. 15, a light/medium grade oil containing multi-functional additives for general use in air ballast pumps, except in the quiet running models. In can of 1 gallon (4·5 l) Each **£0.17. 0.** *f*

LX-140

LUBRICANT, oil, SAE 30, *Edwards* No. 16, a medium grade oil, containing multi-functional additives, for quiet running pumps. In can of 1 gallon (4·5 l) Each **£0.17. 0.** *f*

LX-150

LUBRICANT, oil, SAE 30, a medium grade general purpose oil, suitable for compressors, centrifuges and general machinery. In 1 pt (568 ml) can with spout.
Dozen **£2. 1. 0.** Each **£0. 4.10.** *f*

LX-200

LUBRICANT, grease, a general purpose machinery lubricant recommended for centrifuges and other motor bearings. In tin containing 1 lb net (450 g).
Dozen **£3. 0. 0.** Each **£0. 6. 4.** c

LX-203

LUBRICANT AEROSOL, *Rocket*, containing a low surface tension liquid which has lubricating, penetrating, water repellant and electrical insulating properties. This material is useful for freeing and lubricating even the most inaccessible threads and mechanisms. A thin coating also retards the corrosion of bare metals and protects electrodes and terminals against electrical leakage resulting from moisture. In can containing 6 oz (170 g).
Carton of 12 **£5. 7. 0.** Each **£0. 9. 9.** *m*

LX-205

LUBRICANT, *Kilopoise* **medium,** a lubricant of extremely high viscosity at room temperature i.e. 1·8 kilopoise. It may be used to give smooth and easy motion to components such as oculars, focusing and adjusting screws, variable condensers, potentiometers and needle valves and has many other instrument applications. It acts as a corrosion preventive and sealing agent for both screw and plane contacts. In 1 oz (28 g) tube.
Dozen **£2. 1. 0.** Each **£0. 4.10.** *f*

LX-208

LUBRICANT, anti-scuffing, a most useful dry lubricant consisting of a paste containing molybdenum disulphide. It may be applied to metal, plastics or fabric surfaces by rubbing with the finger, pad or brush. No special degreasing is necessary. It provides dry lubrication for all types of mechanisms and prevents seizing and galling of screw threads. In 2 oz (56 g) tube.
Dozen **£6. 5. 0.** Each **£0.11. 3.** *f*

LUBRICATING GREASES for glass apparatus and ELECTRICAL CONTACT LUBRICANT. See next page.

Vacuum greases for use in high vacuum work see VB-880 et seq. in List No. sequence.

Silicone lubricant in dispenser bottle see EU-066 in List No. sequence.

All items on this page normally available from stock.

LUBRICATING GREASES FOR GLASS APPARATUS

GALLENKAMP
British Made
RUBBER GREASE
MEDIUM
LONDON

LX-220

P.T.F.E
DRY FILM
LUBRICANT

LX-245

LX-210
LUBRICANT, rubber grease, soft, for general lubrication of stopcocks. In 2 oz (56 g) tin.
Dozen **£1.18. 0.** Each **£0. 4. 7.** *c*

LX-220
LUBRICANT, rubber grease, medium, for vacuum stopcocks, desiccators, etc. In 2 oz (56 g) tin.
Dozen **£1.18. 0.** Each **£0. 4. 7.** *c*

LUBRICATION OF BURETTE STOPCOCKS

Stopcocks on burettes or other items of volumetric glassware should NEVER be lubricated with a SILICONE grease. Silicone contamination by 'migration' distorts the shape of the meniscus, alters the amount of drainage and thus DESTROYS ACCURACY. Such contamination is very difficult to remove.

A rubber grease such as LX-210 is specially suitable for lubrication of stopcocks on volumetric glassware.

Electrolube

LX-261
LX-263

2A-X
LECTROLUB
BRAND
LUBRICANT

LX-265

LX-235
LUBRICANT, silicone grease. Highly resistant to chemicals, particularly alkali reagents, with great stability and constant viscosity over a wide temperature range (—40 to 200°C). Practically colourless and non-poisonous. This grease should not be used for volumetric glassware because silicone contamination distorts the shape of the meniscus and alters drainage allowances thus reducing accuracy. Dual purpose grade equally suitable for high vacuum purposes and for general laboratory use as a stopcock lubricant. In 2 oz (56 g) tube.
Dozen **£6.10. 0.** Each **£0.11. 9.** *c*

LX-245
LUBRICANT, PTFE aerosol. A dry film lubricant and anti-stick agent with many useful laboratory applications. It is an aerosol-dispensed dispersion of PTFE to which a non-toxic film-bonding agent has been added.
Lubrication.—Very low coefficient of friction over wide temperature range. Excellent lubricant for ground glass joints, glass or metal stopcocks and many other applications including gears, cam followers, clamps, wood or metal drawers, etc.
Anti-stick uses.—Being chemically inert, insoluble and thermally stable up to 275°C, the lubricant prevents glass joints from sticking and can be used on surfaces of mixers, dies and platens, gaskets, reaction vessels, freezers and frozen objects.
In aerosol can containing 13¾ oz (390 g).
Each **£0.18. 0.** *c*

LUBRICANTS FOR ELECTRICAL CONTACTS

ELECTROLUBE is a chemically inert, water repellent mechanical lubricant which has also a very low electrical resistance with negative temperature coefficient. It will clean and lubricate all types of electrical contacts, switches, relays, potentiometers, sliding rheostats, motor commutators, etc.

It also acts as an arc and tarnish inhibitor and protects against atmospheric humidity. Electrolube can be used over a wide range of temperature (—45 to +200°C). It is used in small quantities and the pocket dispenser is adequate for several months use in the average laboratory.

ELECTROLUBE is available as:

No. 1 (green cap) for general laboratory purposes on low current, non-arcing contacts.

No. 2 (red cap) for higher current, arcing contacts.

No. 2A-X Aerosol, for extensive application and waterproofing of high tension systems and is harmless to polystyrene, PVC, natural and synthetic rubbers.

LX-260
ELECTROLUBE electrical lubricant No. 1 (green cap) in pocket dispenser with flexible capillary applicator, complete with refill capsule ... Each **£0.12. 6.** *m*

LX-261
ELECTROLUBE, No. 1 as above but in 'snorkel' bottle of approx. 2 oz (56 g) ... ... Each **£1. 7. 0.** *m*

LX-262
ELECTROLUBE electrical lubricant No. 2 (red cap) in pocket dispenser with flexible capillary applicator, complete with refill capsule ... Each **£0.15. 0.** *m*

LX-263
ELECTROLUBE, No. 2 as above but in 'snorkel' bottle of approx. 2 oz (56 g) ... ... Each **£2. 0. 0.** *m*

LX-265
ELECTROLUBE, No. 2A-X aerosol in spray can containing 6 oz (170 g) ... ... Each **£1. 1. 0.** *m*

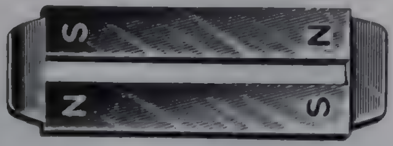
All items on this page normally available from stock.

MAGNETS

MA-505

MAGNETS, bar, strongly magnetised tungsten steel, polished, with keepers.

Length	10	15 cm	
Dozen pairs	**68/–**	**96/–**	c
Pair	**6/10**	**9/–**	

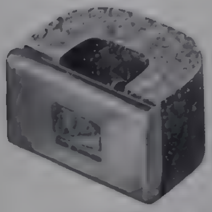


MA-505

MA-510

MA-510

MAGNET, pocket, of great power, contact pull 2·4 kg, made from '*Alnico*,' with keeper. Overall height 25 mm, distance between poles 6·3 mm.
Pack of ten **£1. 15. 0.** Each **£0. 4. 11.** *m*



MA-520

MA-520

MAGNET, in '*Alcomax*', with many times the magnetic energy of tungsten steel permanent magnets. The magnet can be used for handling, lifting and sorting small ferrous parts, work-holding, and as the main component of electrical relays and magnetic filters. Overall height 29 mm, distance between poles 19 mm, contact pull 14·3 kg. Pack of five **£3. 7. 6.** Each **£0. 14. 3.** *m*

MA-530

MA-530

MAGNET, extremely powerful, made from '*Alcomax*'. May be used for the magnetisation of other permanent magnets, testing materials for diamagnetism and paramagnetism, field plotting, demonstrating moving coil galvanometers, motors etc. Overall height 10 cm, distance between poles 4 cm or between removable pole pieces 2·7 cm ... ... Each **£7. 18. 3.** *m*

MA-540

MA-540

MAGNETS, laboratory set, made from '*Alnico*', comprising a pair of bar magnets of length 50 mm, a bridge magnet of overall height 23 mm, and a horseshoe magnet of overall height 35 mm, with keepers, in fitted wooden case ... ... Set **£1. 12. 0.** *m*

MAGNETIC STIRRERS see STIRRERS.

All items on this page normally available from stock.

MA-660

MA-670

MA-700

MA-710

MA-712

MA-730

MA-740

MAGNIFIERS

Important note. All magnifications quoted in this section refer to linear magnification, not area.

MA-660

MAGNIFIER, watchmaker's eye glass, magnification × 1·8. Plastics lens and mount.
Dozen **£0.18. 0.** Each **£0. 3. 1.** *m*

MA-670

MAGNIFIER, lens dia. 64 mm, magnification ×1½, with metal rim and plastics handle.
Dozen **£9.10. 0.** Each **£0.17. 6.** *c*

MA-700

MAGNIFIER, aspheric plastics lens 82 × 64 mm, magnification ×1·3, designed to give a good correction for distortion and field curvature, with plastics frame and handle ... ... Each **£2.14. 6.** *m*

***MA-710**

MAGNIFIER, pocket type, black plastics frame with single folding lens, dia. 25 mm, magnification ×2.
Each **£0. 6. 6.** *m*

***MA-712**

MAGNIFIER, as MA-710, but with two lenses, dia. 25 mm, magnification of each lens separately ×2 or combined ×2·5 ... ... Each **£0. 8. 0.** *m*

MA-730

MAGNIFIER, aspheric, aplanatic pocket type, with folding plastics lens consisting of an air-spaced non-achromatic aspheric doublet of magnification ×3·2 and aperture 18 mm, in plastics frame... Each **£1.10. 0.** *m*

MA-740

MAGNIFIERS, aplanatic, pocket type, in plated metal frame.

Magnification	×10	×15	
Each	**64/-**	**72/-**	*m*

All items on this page normally available from stock.

MA-765

MAGNIFIER, ILLUMINATED. A powerful, hand magnifier fitted with 38·5 mm diameter lens, magnification ×8, and having built-in subject illumination powered by two U-11 batteries in the handle. Supplied with batteries and leathercloth covered case.

Each **£4. 19. 6.** *m*

MA-795

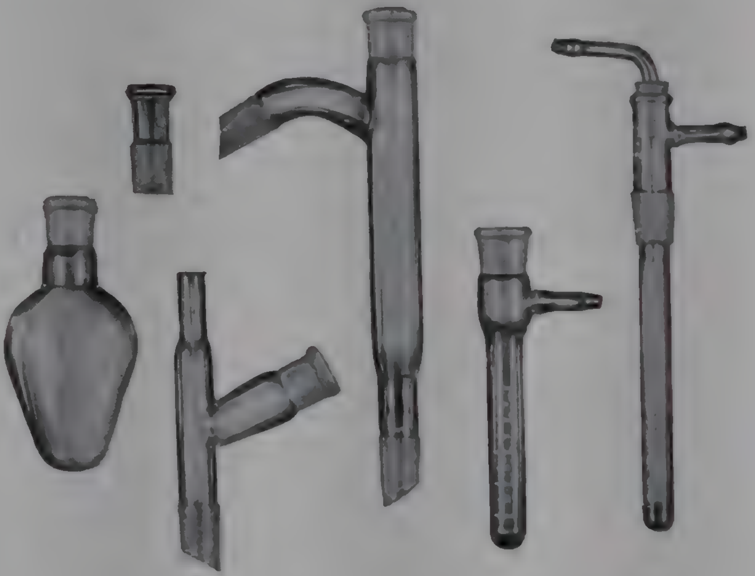
MAGNIFIER, Falmer, with aperture 27 mm dia., magnification ×5, complete on adjustable stand with telescopic tubular arm and locking screws.

Each **£1. 14. 6.** *m*

MA-805

MAGNIFIER, aspheric, in plastics stand. Plastics lens 70×57 mm, magnification ×1·7 with head at a distance of 25 cm from lens. The small field curvature enables comfortable binocular vision over a wide field.

Each **£3. 0. 0.** *m*

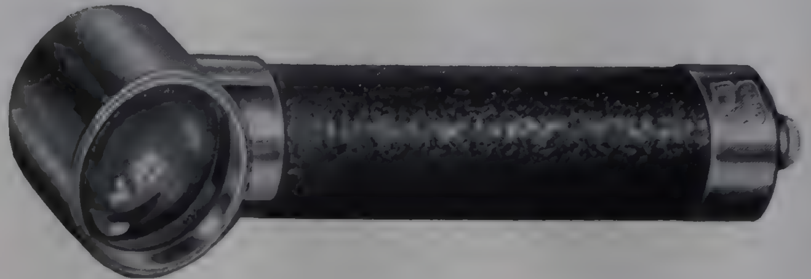


SMALL SCALE PREPARATIVE SET

A set for educational purposes consisting of six simple components with which the basic preparative operations of organic chemistry can be performed.

- ★ **Versatility**
  Permits a maximum number of assemblies for a minimum cost. All components have 14/15 ground joints.
- ★ **Economic**
  The small scale saves space and reduces time taken in setting up. The assemblies are practically self supporting and require a minimum of clamping. Reagent costs are much less than with conventional apparatus.
- ★ **Safe**
  Using smaller quantities of reagent, the set is safer to operate than larger scale glassware. Laboratory fume level is minimised.
- ★ **Robust**
  The components are more robust than their macro equivalent, and generally outlast them.

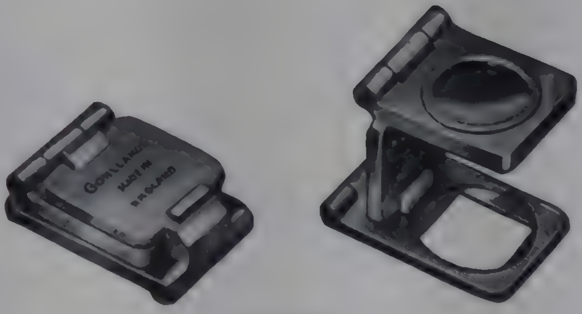
See DT-750 in List No. sequence.



MA-765

MA-795

MA-805



MA-820

MA-820

MAGNIFIER, linen tester, with bi-convex optically worked glass lens, magnification ×8, in folding plastics frame, with aperture ½×½ in.

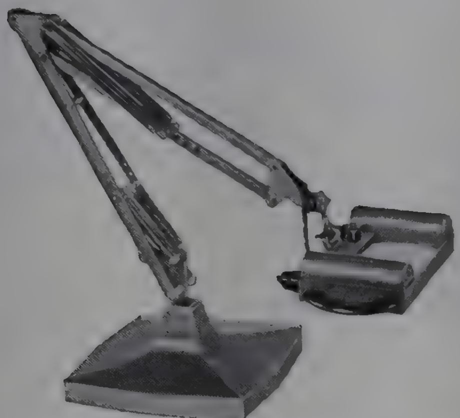
Dozen **£3. 3. 0.** Each **£0. 6. 6.** *m*

All items on this page normally available from stock.

MA-835

MA-835

MAGNIFIER, wide angle, bench standing. The swivelling aspheric lens provides undistorted stereoscopic subject enlargement greater than ×2. Lens size 165×102 mm, focal length 213 mm, maximum depth 225 mm with legs which fold flat. Complete in leather-cloth covered case ... ... Each **£19. 0. 0.** *m*



MA-845

MA-845

MAGNIFIER, illuminated, *Anglepoise.* Has a high powered lens 11×8 cm with a 25W lamp on either side controlled by a push on/off switch. The lens assembly has convenient handles and is mounted on an Anglepoise arm giving instant adjustment over a 150 cm diameter. Supplied with a heavy transportable base. Each **£12. 0. 3.** *m*

MA-854

MA-854

MAGNIFIER, wide angle, illuminated, bench standing. The swivelling aspheric lens provides undistorted stereoscopic subject enlargement greater than ×2. Lens 165×102 mm, focal length 213 mm, maximum depth 216 mm. Lens height and angle are fully adjustable. Illumination is by two fluorescent tubes. Complete in leathercloth covered case. For 220/250V a.c. supplies. Each **£29. 10. 0.** *m*

THERMOMETER READING MAGNIFIERS, see TJ-900 and TJ-905 in List No. sequence.

STEREOSCOPIC MAGNIFIER

A free standing stereoscopic magnifier with built in top illumination for the examination of surfaces or solid objects. The *Stereomaster* is suitable for Nuffield 'O' and 'A' level biology courses.

A heavy base houses a transformer which supplies the low voltage illuminating lamp. A vertical 300 mm steel pillar supports a 250 mm knuckle arm upon which is mounted the focusing mechanism of the optical head which provides an upright image. The prism boxes are coupled for adjustment of interpupillary distance. Accessories include supplementary lenses and a transmitted light base.

Table of magnifications, working distances and fields of view.

Supplementary lens	Overall magnification	Working distance mm	Field of view mm
None	×10	160	21
×2	×20	90	10
×3·5	×35	90	6·5

MA-900

MA-900

MAGNIFIER, *Prior Stereomaster,* as specification, with ×10 stereoscopic head and dust cover. For 220/240V a.c. single phase supplies ... ... Each **£40. 10. 0.** *f*

REPLACEMENT PART

MA-905	**Lamp bulbs, 6V 6W** ...	Pack of 6	**£0. 11. 0.**	*f*

ACCESSORIES

MA-910	**Supplementary lens ×2**	Each	**£6. 0. 0.**	*f*
MA-912	**Supplementary lens ×3·5** ...	Each	**£9. 0. 0.**	*f*
MA-916	**Transmitted light base** with frosted glass stage, slide clips and socket for mounting the lamp assembly otherwise used for top illumination	Each	**£2. 10. 0.**	*f*
MA-920	**Polished wooden storage case** ...	Each	**£4. 0. 0.**	*f*

All items on this page normally available from stock.

Gallenkamp MANIPULATOR GLOVE BOX

with automatic air-lock loading hatch

Originally developed for handling radioisotopes having a relatively low level of activity, this manipulator glove box has many applications in other fields.

Alpha emitters and/or purely beta emitters, for example C^{14} compounds, can be safely and conveniently handled in this apparatus and the health hazard associated with carrying out many radiochemical reactions and operations is reduced to a minimum. Operations involving grinding, stirring, filtering, gentle heating etc. may be carried out in the manipulator box under controlled conditions.

Toxic materials may be handled in dry powder form without danger from airborne particles. Hygroscopic substances can be handled without difficulty and operations where it is necessary to exclude air, or work under dust-free conditions, are possible with this apparatus. In bacteriological work, operators may to a large extent be protected from infection.

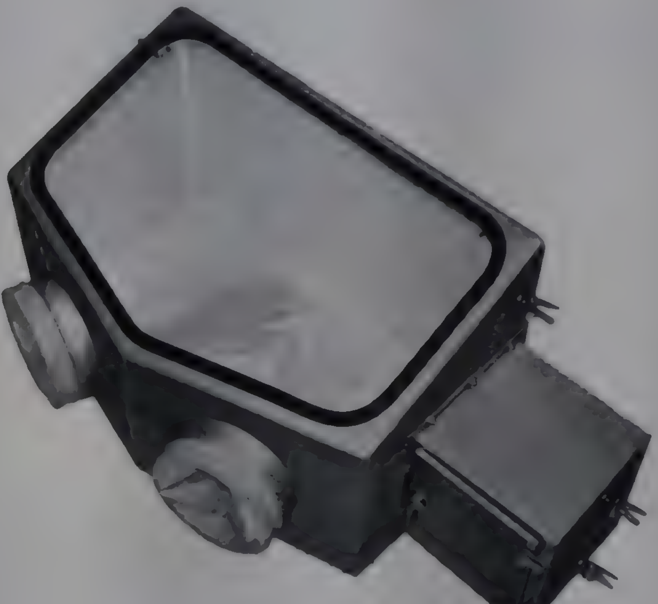
CONSTRUCTION

The box and loading hatch are made from heavy gauge steel sheet, rustproofed and stove enamelled. All the corners of the box are radiused to permit easy cleaning. Rubber feet are fitted to the base. The large Perspex window is sealed in place by an air-tight gasket. Two glove ports at the front are fiitted wth ambidextrous rubber gauntlets held in place by stretching their beaded sleeve ends over the openings of the ports. Gloves are thus replaced easily and quickly but a double groove on each glove port prevents the gloves from being detached accidentally.

The loading hatch is in the form of an automatic air-lock with two air-tight doors interconnected by a neat interlocking mechanism to prevent either being opened until the other is correctly shut. Both the box and loading hatch are fitted with stopcocks for connection to dry air or inert gas supply. The box can be used at negative pressure up to 1½ in w.g. and a 5 cm diameter hole, normally covered by a removable plate, permits the fitting of an adapter to which a 5 cm bore hose can be connected. The box is supplied with an internal polystyrene tray 46 × 35 cm.

Dimensions

Manipulator box (excluding hatch)	67 × 45 × 42 cm high
Loading hatch	22 × 22 × 21 cm high
Loading hatch door	19 × 19 cm
Glove ports	16·5 cm
Top window	61 × 37 cm
Overall width	102 cm



MA-950

MA-950

MANIPULATOR GLOVE BOX, *Gallenkamp*, as specification, supplied with two MA-955 latex gloves size 9. If alternative gloves required, please state List No. and size when ordering ... ... Each **£88. 10. 0.** *b*

ACCESSORIES AND REPLACEMENTS

MA-951 **Adapter,** for connecting 5 cm bore hose. Each **£1. 2. 6.** *b*

MA-953 **Sleeve,** rubber, open ended, beaded at both ends to fit glove port and to seal on wrist allowing surgical gloves to be worn. Dozen **£13. 15. 0.** Each **£1. 5. 0.** *m*

MA-955 **Gloves,** gauntlet with beaded edge, ambidextrous, **natural latex.**

Size	7	8	9	10	
Per dozen gloves	**360/–**	**360/–**	**360/–**	**360/–**	*m*
Per glove	**33/–**	**33/–**	**33/–**	**33/–**	

MA-957 **Gloves,** as MA-955 but in **neoprene.**

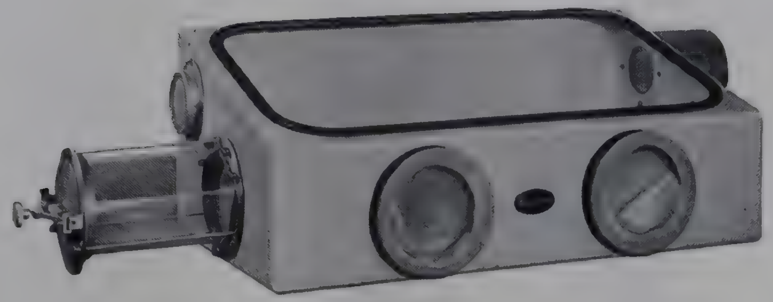
Size	7	8	9	10	
Per dozen gloves	**400/–**	**400/–**	**400/–**	**400/–**	*m*
Per glove	**36/–**	**36/–**	**36/–**	**36/–**	

Gloves similar to MA-955 but **lead loaded rubber** are available to order.

Glove size fitting measurements see instructions on page 156.

All items on this page normally available from stock.

MANIPULATOR GLOVE BOXES



MA-970

MA-970

MANIPULATOR GLOVE BOX, for the safe handling of low activity radioisotopes, bacteria, toxic substances and other hazardous materials. An important feature is the hermetically sealed air lock, equipped with quick action doors, permitting passage of materials in and out of the box without affecting the internal conditions.

The box is fabricated from mild steel, finished internally white glaze vitreous enamel, with radii on all corners. An extraction fan maintains a slight negative pressure against the possibility of small leaks at the glove ports or air lock. Air is exhausted through a disposable micro-filter; air entering the cabinet is filtered down to 2 microns. There are two glove ports fitted with gauntlets MA-955 size 9 for manipulation of apparatus within the box. The viewing panel is plate glass. A removable panel at one end can be adapted to take any services required inside the box. For 220/240V 50 Hz single phase supplies.

Dimensions

4 ft 9 in wide overall × 1 ft 8 in deep × 1 ft 3 in high.
The width of the box is 3 ft ... ... Each **£143. 0. 0.** *f*

If alternative gloves required please state List No. and size when ordering.

ACCESSORIES AND REPLACEMENTS

MA-955 **Gloves,** latex ... } For details and prices see entries in List No. sequence.
MA-957 **Gloves,** neoprene ... }

MA-980

MA-980

MANIPULATOR BOX, PATHOLOGICAL. Conforming with British Medical Council practice, this unit ensures positive protection to operators in the preparation of cultures and grinding of contaminated tissues and other hazardous operations. Suitable for bench mounting and fabricated from mild steel, the interior of the cabinet is finished white stoved enamel with well radiused corners. In service there is an air flow across the cabinet aperture giving an air change every 25 seconds. The exhaust air is passed through an expendable filter which is arranged so that it need not be handled prior to incineration. The filter element container may be sterilised by UV rays. Complete with 60W striplight, UV lamp with safety cut-out, flue for bunsen burner and front closure plate.

Dimensions

3 ft wide × 2 ft 1 in deep × 2 ft 9 in high.
Each **£172. 0. 0.** *fN*

When ordering please state voltage and nature of supply.

SYSTEME INTERNATIONAL D'UNITES, SI UNITS

In May 1966 the British Government expressed their official view, that British industries should adopt metric units, sector by sector until the metric system becomes the primary system of weights and measures in the United Kingdom. At the same time the British Standards Institution (BSI) was asked to give the lead by the speedy metrication of British Standards and to plan the changeover programmes in consultation with each industry.

The initial step was the adoption by the BSI of the SI units, which has been internationally accepted by the Conference General des Poids et Mesures in 1960, approved by the International Organisation for Standardisation (ISO) and published in a British Standard (BS 3763) * in 1964. Since that date, the BSI has issued a number of other publications relating to particular aspects and applications of the system including PD 5686 * in 1967 'The use of SI units', also a useful conversion slide rule.

The SI system is a coherent system of units in which the product of any two unit quantities is the unit of the resultant quantity. There are six basic units: length, mass, time, electric current, absolute temperature and luminous intensity. These and the derived units as well as their multiples and sub-multiples have all been defined and assigned symbols. Many are familiar already, particularly those in regular use in the pure sciences and in many metric countries. All will become better known within the next few years.

In this catalogue SI units have been used wherever practicable. We have only retained Imperial units in those cases where conversion might be misleading or inappropriate or because the item is used in a field where the metric equivalent value is not yet generally recognised. We have deliberately avoided converting every unit of British measure into its approximate metric equivalent. As metrication proceeds it is our intention to keep pace with the change until eventually the only units used will be SI units.

*The above publications are available from The British Standards Institution, Newton House, 101 Pentonville Road, London N.1.

Items on this page normally available from stock except those coded ***N.***

MANOMETERS

MB-020

MANOMETERS, (AG), for pressure or vacuum, on hardwood board, with boxwood scale graduated in mm up and down on opposite sides from the centre zero. The board is drilled for mounting on a cast iron foot MB-040, if required. **Without foot or mercury.**

Scale above and below zero	25	50 cm	
Each	**48/–**	**78/–**	a

MB-022 Glass U-tubes, spare, for MB-020.

Size	25	50 cm	
Each	8/9	17/–	a

MB-026

MANOMETERS, (AG), as MB-020, but graduated in 0·1 in with wider bore glass tube for use with water. **Without foot.**

Scale above and below zero	5	10 in	
Each	**42/–**	**48/–**	a

MB-028 Glass U-tubes, spare, for MB-026.

Size	5	10 in	
Each	7/6	8/9	a

MB-030

MANOMETER, (AG), single tube and reservoir pattern, on hardwood board, with sliding boxwood scale graduated 0–100 cm in mm. The board is drilled for mounting on a cast iron foot MB-040, if required. **Without foot or mercury** ... ... Each **£5. 0. 0.** a

MB-032 Glass part, spare, for MB-030 ... Each £1. 1. 0. a

For suitable mercury see MF-932 in List No. sequence.

MB-040

FOOT, cast iron, for use with manometers MB-020, MB-026 and MB-030 ... ... Each **£2. 3. 0.** b

VACUUM MANOMETERS

MB-050

MANOMETER, Anschutz, (AG), with stopcock, on wooden stand with adjustable anodised aluminium scale, graduated 10–0–10 cm in mm. Supplied evacuated and filled with mercury to the stopcock, and therefore requires adjustment of the charge before use. Each **£5. 18. 0.** a

MB-052 Glass part, spare, for MB-050, with stopcock, unfilled. Each £2. 2. 0. a

MB-054 Glass part, spare, as MB-052, but mercury filled. Each £3. 12. 0. a

MB-060

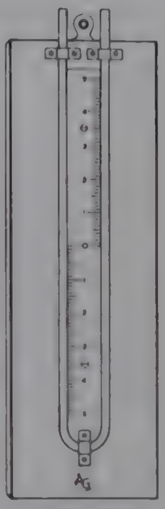
MANOMETER, Anschutz, (AG), borosilicate glass, as MB-050, with stopcock and **fritted glass seal** instead of closed end. Easily filled by adding a few ml of mercury to the funnel to produce a seal, and then by applying gentle suction to the funnel nozzle, mercury is introduced through the stopcock to fill the capillary. Air displaced from the capillary passes through the fritted plate. On wooden stand, with adjustable anodised aluminium scale graduated 10–0–10 cm in mm. **Without mercury.** Each **£4. 16. 0.** a

– **MB-062** Glass part, spare, for MB-060, with stopcock. Fritted plate dia. 10 mm. Ref. No. 18X4 ... Each £2. 8. 0. a

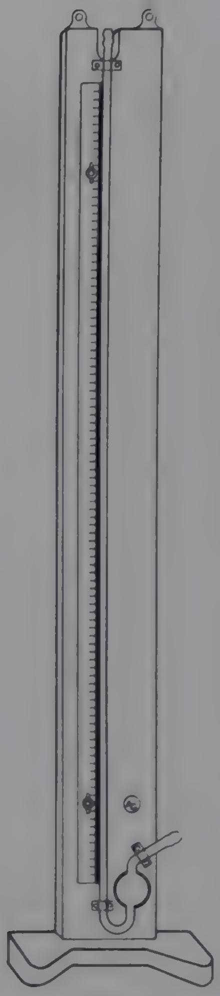
For suitable mercury see MF-932 in List No. sequence.

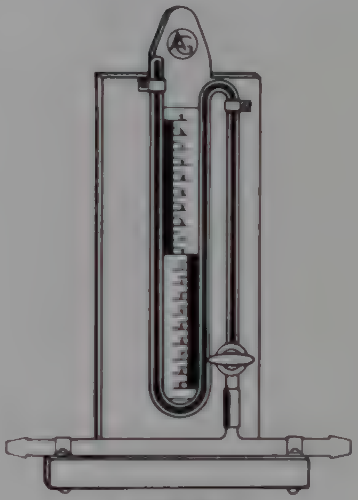
GJ-300
PRESSURE GAUGES, Bourdon tube pattern.

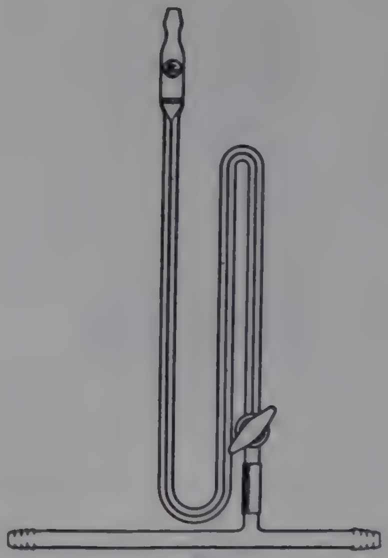
GJ-330
VACUUM GAUGES, Bourdon tube pattern.
For details see entries in List No. sequence.

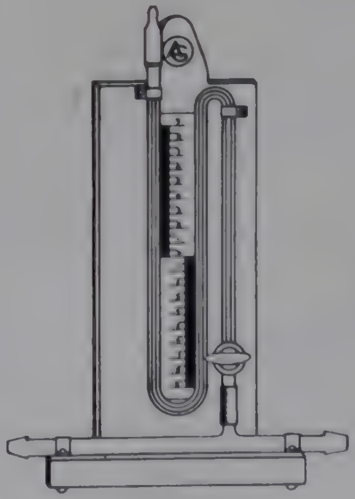

MB-020
MB-026

MB-040

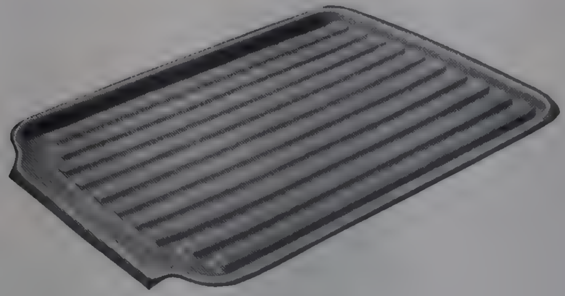

MB-030
with MB-040


MB-050

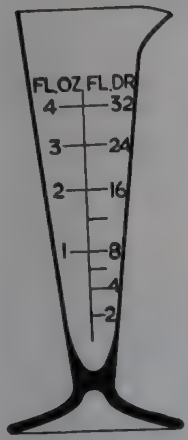

18X
MB-062


MB-060

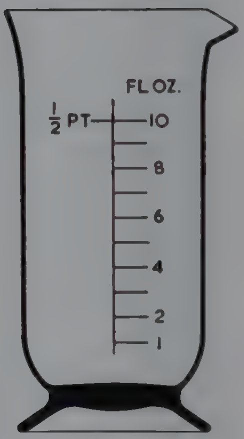
All items on this page normally available from stock.



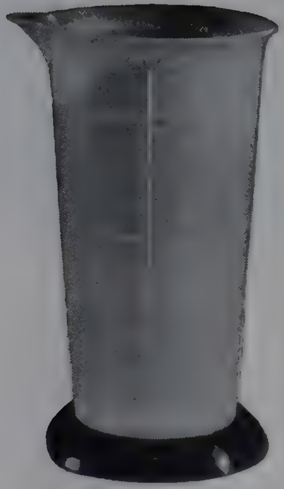
MB-480



MB-860
MB-865



MB-880
MB-885



MB-920

JV-100
MEASURE JUGS, enamelled steel.

JV-250
MEASURE JUGS, polypropylene.
For details see entries in List No. sequence.

MATS

MB-450
MATS, absorbent, 11 cm dia., 3 mm thick. For preventing spilt acids or boiling liquids from running over benches, thus reducing the possibility of damage or accidents. They can also be used as crystal drying pads.
Pack of 100 **£1. 2. 6.** *m*

MATS, asbestos millboard, for bench protection, see AR-472 in List No. sequence.

MB-480
MAT, draining, polythene, for use on bench or draining board. Reduces glassware breakage. Size 44 × 35 cm.
Each **£0. 10. 9.** *m*

MEASURES

PHARMACEUTICAL AND PHOTOGRAPHIC

MB-860
MEASURES, graduated, Board of Trade stamped, conical form on foot. Graduated in fl. dr. and fl. oz.

Capacity	2 16	4 fl. oz 32 fl. dr.	
Dozen	**145/–**	**155/–**	c
Each	**13/3**	**14/–**	

MB-865
MEASURES, as MB-860, but unstamped.

Capacity	2	4 fl. oz	
Dozen	**66/–**	**78/–**	c
Each	**6/8**	**7/8**	

MB-880
MEASURES, graduated, Board of Trade stamped, cup form on foot. Graduated in fl. oz and pt.

Capacity	10 ½	20 1	40 fl. oz 2 pt	
Dozen	**190/–**	**215/–**	**260/–**	c
Each	**17/6**	**19/6**	**23/6**	

MB-885
MEASURES, as MB-880, but unstamped.

Capacity	10	20	40 fl. oz	
Dozen	**100/–**	**125/–**	**170/–**	c
Each	**9/3**	**11/3**	**15/6**	

MB-920
MEASURE, graduated polythene, conical form with two double scales graduated in 0–500 cm³ in 50 cm³ and 0–20 fl. oz in 1 fl. oz for right and left hand use. With detachable polythene foot to improve stability.
Dozen **£1. 16. 0.** Each **£0. 4. 6.** *m*

All items on this page normally available from stock.

MEDICAL SCIENCES

Grouped in this section will be found a wide range of laboratory apparatus and instruments required in **Bacteriological, Biochemical, Clinical** and **Physiological** laboratories in hospitals, universities and clinics. In view of the overlapping uses of many items in different types of laboratories the section has been arranged alphabetically instead of making artificial subdivisions.

All apparatus of specifically medical usage is included in this section but much apparatus used in medical laboratories has also other uses and appears in other parts of the catalogue. Useful cross reference lists are shown.

CATALOGUE HEADINGS UNDER WHICH APPARATUS OF MEDICAL INTEREST IS INCLUDED

- Autoclaves
- Calorimeters
- Centrifuges
- Chromatography
- Colorimeters
- Culture apparatus
- Dissecting equipment
- Filters
- Flame analyser
- Freeze drying
- Histology
- Incubators
- Magnifiers
- Microchemical apparatus
- Microscopes
- Micromanipulators
- Microtomes
- Nitrogen determination
- Ovens
- Pipettes
- Refrigerators
- Sterilizers
- Syringes

CROSS REFERENCES TO ITEMS UNDER OTHER HEADINGS

Agglutination baths	see	Water baths
Ampoule cutters	see	Glassblowing tools
Anaerobic apparatus	see	Culture apparatus
Bacterial incinerator		
Baskets for sterilising	see	Sterilisers
Blood alcohol	see	Quickfit apparatus
Blood gas	see also	Gas analysis
Blood storage cabinet	see	Refrigerators
Bottles, culture	see	Culture apparatus
general	see	Bottles
Boxes, sterilising	see	Sterilisers
Conway burette	see	Burettes
Colony counter	see	Culture apparatus
Cotton wool		
Culture dishes		
flasks		
tubes		
Dishes, Petri		
Embedding baths	see	Histology
Forceps	see	Dissecting equipment
Mercury vapour meter	see	Mercury handling apparatus
Microscope slides and cover glasses	see	Histology
Petri dishes	see	Culture apparatus
Photometer, grey wedge	see	Colorimeters
Plates, agglutination etc.	see	Plates
Pumps filter	see	Filter pumps
vacuum	see	Vacuum pumps
Racks, sterilising	see	Sterilisers
Roll tube equipment	see	Culture apparatus
Scalpels	see	Dissecting equipment
Scissors		
Spectroscope, Hartridge, reversion	see	Spectroscopes
Staining equipment	see	Histology
Tally counters	see	Counters
Teats, rubber	see	Rubber sundries
Tubes, agglutination	see	Test tubes
Wasserman baths	see	Water baths

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Wintrobe tubes 463

AIRBORNE BACTERIA SAMPLER

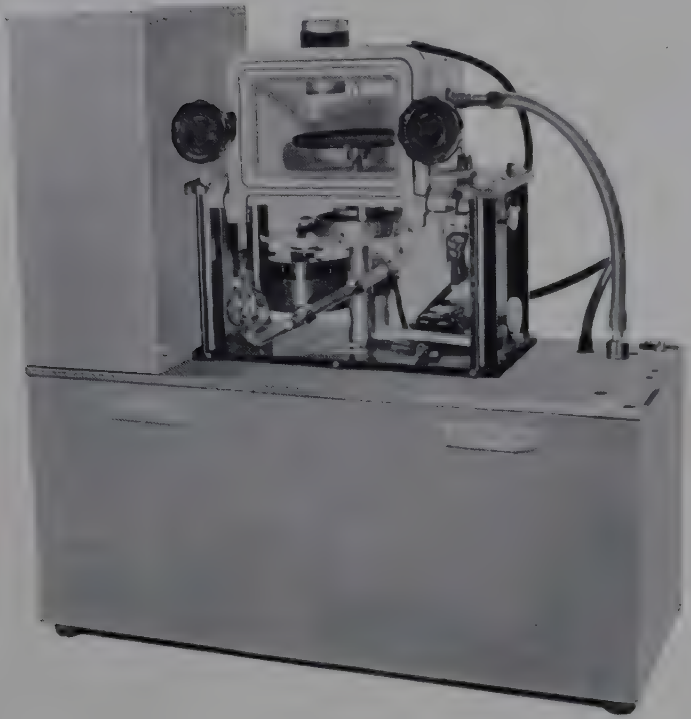
This instrument is designed to sample the population of airborne bacteria in concentrations varying from 1 to 1000/ft^3.

PRINCIPLE

Air is sucked through a narrow slit on to a 10 cm agar culture plate whose surface is adjusted to be 2 mm below the slit. At the same time the plate revolves at a uniform speed thus spreading the bacteria evenly on the plate and enabling the precise time of deposition to be calculated. The culture plate is then incubated, after which the colonies may be counted, either directly or through a ruled screen or indirectly on a bromide paper print.

CONSTRUCTION

The turntable on which the culture plate rests is driven by a synchronous motor through a gear train at 2, 1/2 or 1/5 rev/min. Normally the plate can only rotate once but continuous rotation can be made if desired. A manometer indicates the suction pressure which corresponds to an airflow of approximately 28 l/min through the slit which is 0·3 mm wide × 28 mm long.



MC-300

MC-300

AIRBORNE BACTERIA SAMPLER, as specification, complete with diaphragm pump, for 110/120 or 220/240V 50/60 Hz ... ... Each **£185. 0. 0.** *mN*

When ordering please state voltage and nature of supply.

AMPOULE CUTTERS

MC-360

AMPOULE FILE, flat shape. Per 1000 **£2. 0. 0.** c

AMPOULE CUTTERS, see glass tube cutters GP-175 and GP-180 in List No. sequence.

AX-100

Gallenkamp AUTOCLAVES

For electric, gas or steam heating.

Designed in accordance with BS 2646 for sterilisation up to 2·1 kg/cm^2 (30 lb/in^2).

Approved by the Associated Offices Technical Committee for insurance purposes and accepted by all insurance companies. Each autoclave is fully tested under working conditions prior to despatch and a certificate is supplied showing essential details of construction and of pressure tests applied during manufacture.

- **Attractive exterior**
- **Rugged construction**
- **Simple and safe in use**

See AX-100 et seq. in List No. sequence.

Also available, a range of automatic, portable and other vertical and horizontal autoclaves to suit a variety of applications—see AX-250 et seq.

Items on this page normally available from stock except those coded *N.*

Gallenkamp
REGD TRADE MARK

SLIDING WEIGHT BALANCES

Sturdily constructed beam balances designed to withstand rough usage and eminently suitable for heavy duty in hospital laboratories.

Dual scaled with built-on weights:

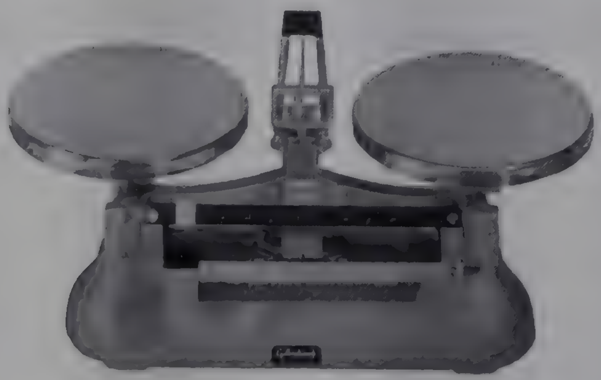
Upper scale—0–10 g in 0·1 g.
Lower scale—0–200 g in 10 g.

Total capacity 2000 g with external weights.

Available with circular pans and scoops in stainless steel and chromium plate.

See BC-110 et seq. in List No. sequence.

Also available, an extensive range of student, analytical and precision type balances, including the famous *Mettler* models, for all biological, medical and allied applications—see BA-500 et seq.



BC-110

Gallenkamp
REGD TRADE MARK

BALLISTIC BOMB CALORIMETER

For the rapid determination of calorific values of foodstuffs and faeces in dietetic and metabolic research and other applications.

The Ballistic Bomb Calorimeter was developed in collaboration with D. S. Miller and P. R. Payne at the Human Nutrition Research Unit of the M.R.C.

REFERENCES

Fox, Miller and Payne, Proc. Nutr. Soc. 18(ix) (1959).
Miller and Payne, Brit. J. Nutr. 12, 501 (1959).

In ascertaining the calorific value of foodstuffs and other non-homogeneous materials, it is frequently difficult to obtain a truly representative single sample. In such cases the average of a number of approximate results can be superior to a single, accurate result from one sample.

The object of the Ballistic Bomb Calorimeter is to enable this to be done with speed. No special skill is required and 10 results per hour can be obtained to an accuracy of 1%.

See CB-370 et seq. in List No. sequence.

Also available, *Gallenkamp* AUTOBOMB Automatic Adiabatic Bomb Calorimeter for high accuracy tests to standard methods—see CB-100 et seq.

Gallenkamp

CB-370

BLOOD GAS ESTIMATION

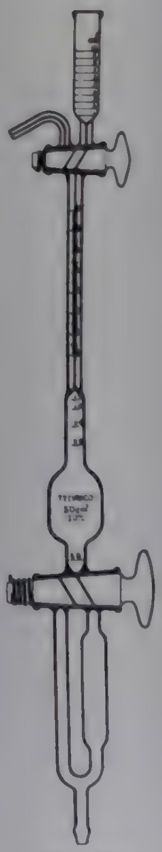
MC-450

BLOOD GAS APPARATUS, VAN SLYKE, volumetric, *Technico*, a simple apparatus for the determination of CO, CO$_2$ and O$_2$ in blood or blood plasma. **Without reagents** ... ... Each **£4.18. 0.** *a*

ACCESSORIES

MC-521	**Pipette, Hempel-Van Slyke,** for use with MC-450 for the admission of gas samples to the top of the manometer bulb.
ME-340	**Pipettes, Ostwald-Van Slyke**
ME-342	**Pipettes, Ostwald-Van Slyke**

For details and prices of the above see entries in List No. sequence.



MC-450

All items on this page normally available from stock.

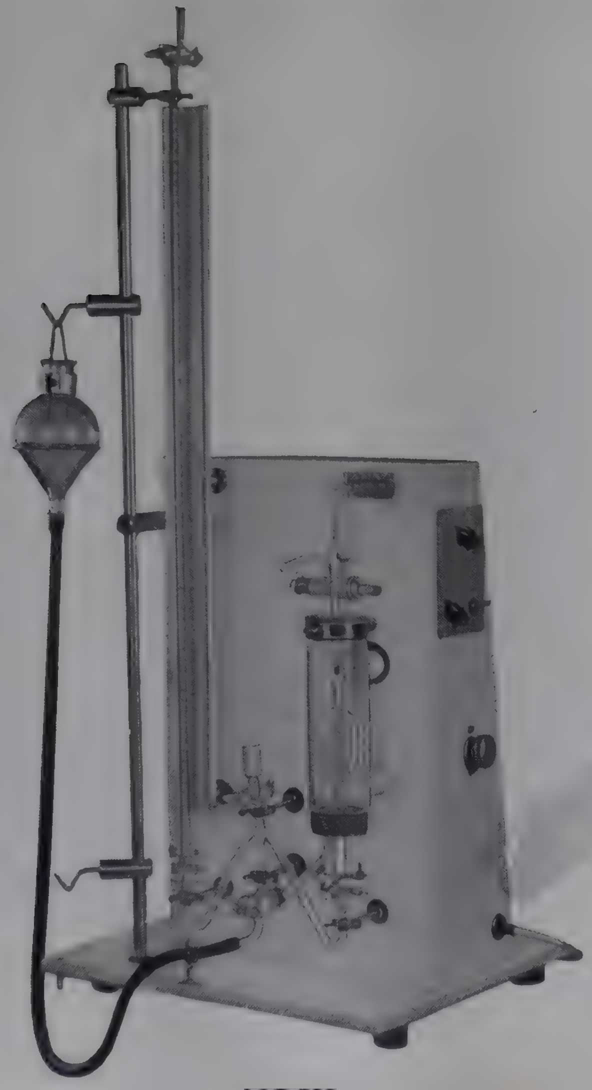
Gallenkamp VAN SLYKE MANOMETRIC APPARATUS

WITH MAGNETIC AGITATION

For the determination of gases in blood, plasma and urine, and other applications.

- No shaking parts, breakage minimised
- Interchangeable glassware, easily replaced
- Optional macro and micro reaction pipettes
- Built-in illuminator, timer and buzzer

The original apparatus was devised by Dr. Donald D. Van Slyke and is fully described, together with detailed methods of use, in 'Quantitative Clinical Chemistry' Vol. 2 by Peters and Van Slyke. The use of magnetic agitation and many other carefully tested refinements make the *Gallenkamp* apparatus the most advanced available.



MC-500

CLEAN DURABLE STAND

A white enamelled case 50 cm high, stands on a mercury tray 36 × 38 cm fitted with polythene feet and a drain plug. A stainless steel rod supports a manometer shield and clamp and two mercury reservoir support hooks. All glassware mounting clamps are easily adjusted and quickly removed for dismantling and cleaning the glassware. Anchorage is provided for the flexible reservoir connecting tube and a lamp is fitted behind the reaction pipette for improved observation.

QUIET, VIBRATION-FREE AGITATION

A powerful magnet driven by an induction motor rotates a magnetic follower in the reaction pipette. The motor position is adjustable to give optimum stirring conditions. Complete reaction normally occurs within three minutes.

REACTION PIPETTES

The standard reaction pipette is graduated at 50, 2 and 0·5 cm^3 and the funnel to 10 cm^3 with 1 cm^3 sub-divisions. The stopcock has a large diameter key which needs a minimum of greasing. The pipette is mounted in a water jacket which has a translucent back and is fitted with a thermometer TJ-380 reading from 10 to 40°C in 0·2°C sub-divisions.

A modified Van Slyke pipette for determinations of CO_2 in 0·1 ml blood samples, which was originally introduced by the late Professor F. Rappaport[1], [2], of the Hadassah Medical School, Hebrew University, has now been adapted to be interchangeable with the conventional 50 cm^3 pipette. It is useful where normal quantities of sample are unobtainable (as for example in paediatric cases) and comprises a reaction vessel with a 7 ml bulb in which a magnetic follower is placed and the stem immediately above it with a capacity of 0·4 cm^3 to the stopcock, sub-divided in 0·01 cm^3. The funnel is calibrated to 1·5 cm^3 in 0·1 cm^3. This pipette also has a generously dimensioned stopcock. It is mounted in a water jacket and supplied with a thermometer TJ-380.

QUICKLY DEMOUNTED MANIFOLD

The stout glass manifold connects to both manometer and reaction pipette by interchangeable spherical joints. The side tubes are shaped to prevent gas bubbles being trapped at the bends. The spherical joints together with easily adjusted support clamps greatly simplify stripping and re-assembly and the risk of breakage is much reduced. Robust, large surface stopcocks provide good mercury control without the need for frequent regreasing.

MANOMETER AND MERCURY RESERVOIR

The manometer is scaled in mm divisions to a height of 65 cm. The white shield gives it protection and assists in reading the scale. The 250 ml reservoir is suspended in a stainless steel carrier which hooks on the support rod.

AUTOMATIC TIMING

The apparatus is fitted with a clockwork driven time switch, range up to 8 minutes, and a warning buzzer.

AUXILIARY APPARATUS

Plastics wash bottles are recommended for the addition and removal of water, reagents and mercury. Ostwald-Van Slyke pipettes, Hempel-Van Slyke pipettes, a manometer reader, polythene wash bottles and stopcock grease are listed on page 461.

Gallenkamp VAN SLYKE APPARATUS

MC-500

VAN SLYKE MANOMETRIC APPARATUS, *Gallenkamp*, as specification, fitted with standard reaction pipette assembly MC-504. Requires but does not include 2 kg mercury. For 200/250V 50 Hz supplies.
Each **£82. 10. 0.** *b*

MC-502

VAN SLYKE MANOMETRIC APPARATUS, *Gallenkamp*, as specification, fitted with **Rappaport** micro reaction pipette assembly MC-506. For 200/250V 50 Hz supplies ... ... Each **£78. 10. 0.** *b*

Other voltages can be supplied to special order.

1. Rappaport, Eichorn and Nutman, J. Clin. Path., **9**, 1956, 166.
2. Rappaport, Eichorn and Nutman, Clin. Chin. Acta, **1**, 1956, 305.

CONVERSION ACCESSORIES

MC-504

STANDARD REACTION PIPETTE ASSEMBLY, comprising pipette MC-514, water jacket MC-516, thermometer TJ-380, rubber stoppers and supporting bracket, supplied with three magnetic followers MC-515.
Set **£12. 15. 0.** *a*

This assembly converts MC-502 into MC-500.

MC-506

MICRO REACTION PIPETTE ASSEMBLY, Rappaport, comprising pipette MC-517, water jacket MC-519, thermometer TJ-380, rubber stoppers, supporting bracket and thermometer clip, supplied with three magnetic followers MC-518... ... Set **£9. 10. 0.** *a*

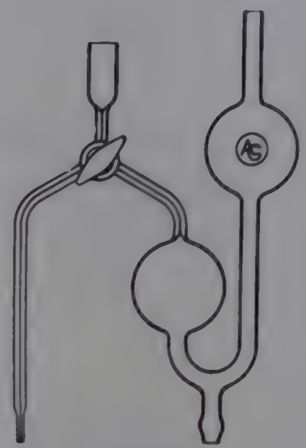
This assembly converts MC-500 into MC-502.

REPLACEMENT PARTS for MC-500 and MC-502

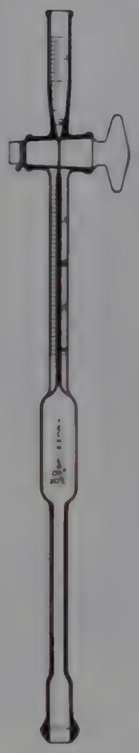
MC-510	**Manometer tube**		Each **£4. 16. 0.**	*a*
MC-512	**Manifold**		Each **£4. 12. 0.**	*a*
MC-514	**Reaction pipette,** standard, with 50 cm³ bulb and 2 cm³ stem		Each **£6. 5. 0.**	*a*
MC-515	**Magnetic follower,** for MC-514.	Dozen **£2. 2. 0.**	Each **£0. 4. 11.**	*b*
MC-516	**Water jacket,** for MC-514, without rubber stopper.		Each **£0. 17. 0.**	*a*
MC-517	**Reaction pipette,** Rappaport micro, with 7 ml ungraduated bulb and 0·4 cm³ stem subdivided 0·01 cm³.		Each **£4. 12. 0.**	*a*
MC-518	**Magnetic follower,** for MC-517.	Dozen **£2. 2. 0.**	Each **£0. 4. 11.**	*b*
MC-519	**Water jacket,** for MC-517, without rubber stopper.		Each **£0. 14. 6.**	*a*
TX-770	**Tubing,** vinyl, 6·35 mm (125 cm reqd.) ...		For prices see entries in List No. sequence.	
TJ-380	**Thermometer,** for water jacket			
MF-920	**Mercury reservoir,** heavy glass, 250 ml ...			
MF-378	**Lamp,** 15W			
MC-520	**Joint clamps,** for spherical joints.			

Size Used on	Small Manometer combustion pipette	Large Reaction vessel	
Each	5/9	8/6	*b*

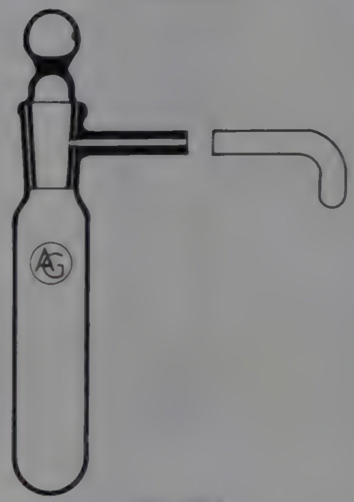
Van Slyke Manometric Apparatus with gas reservoir and combustion pipette—see **GC-500.**



MC-521



MC-517



MC-524

ACCESSORIES

MC-521	**Gas pipette, Hempel-Van Slyke,** (AG), **borosilicate glass,** capacity 50 ml, for introduction of gaseous samples into Van Slyke gas analysis apparatus.	Dozen **£30. 0. 0.**	Each **£2. 14. 0.**	*a*
MC-524	**Ninhydrin reaction vessel,** (AG), for the gasometric determination of free amino acids in blood filtrates by the ninhydrin—CO_2 method (Hamilton and Van Slyke, **J. Biol. Chem. 150, 1943: 231).** Consists of reaction tube with capillary side arm, ground stopper with side hole and glass plug. For use with MC-500 only.		Each **£1. 8. 6.**	*a*
ME-340	**Pipettes, Ostwald-Van Slyke,** *Technico* Class A, to deliver between two graduations, the lower mark being high enough to permit reading when the pipette is inserted in the cup of the reaction pipette. Capacities 0·2 to 5 cm³		For details and prices see entries in List No. sequence.	
ME-342	**Pipettes, Ostwald-Van Slyke,** as ME-340 but with stopcock			
ME-344	**Pipettes, Ostwald-Van Slyke,** *Technico* special three-mark pipette for Rappaport reaction pipette, to deliver 0·05 and 0·01 cm³ between marks. The waste volume is kept to a minimum by the use of fine bore capillary tubing below the bottom mark			
ME-346	**Pipettes, Ostwald-Van Slyke,** as ME-344 but with stopcock			
MF-932	**Mercury,** triple distilled			
LX-110	**Lubricant,** suitable for stirrer motor ...			
WB-100	**Wash bottle,** polythene			
VB-082	**Lubricating grease,** Apiezon-M, for stopcocks			
TJ-900	**Reader,** for manometer, ×5 magnification.			

All items on this page normally available from stock.

BLOOD GAS ANALYSER

A trolley-mounted system for the determination of pH, Po_2 and Pco_2 at the bedside, in the operating theatre, in the laboratory or beside a heart-lung machine.

- **Direct reading**
- **Requires only small samples**
- **Combines simplicity with accuracy**

MC-600

PERFORMANCE AND OPERATION

Separate aliquots of the blood sample under test are injected into each of three separate electrodes (previously standardised) and the pH, Po_2 and Pco_2 are read directly from a single meter by operating an electrode system selector switch. A recorder output of 0–1·4 mA into 1·5 kΩ is provided. The following table shows the average performance of the analyser:

	Minimum sample volume per determination	Range	Time delay before reading
pH	0·1 ml	6·6–8·0 pH	½ minute
Po_2	0·1 ml	0–160 mm Hg 0–800 mm Hg	1 minute
Pco_2	0·1 ml	10–160 mm Hg	2–3 minutes

Standardisation of the electrode systems

pH electrode: by standard pH buffer solutions.
Po_2 electrode: by using two gases of known Po_2 value.
Pco_2 electrode: by using two gases of known Pco_2 value.

CONSTRUCTION

As normally supplied, the analyser comprises a trolley mounted cabinet which houses the electrometer, and a drawer suitable for carrying electrode system spares and other accessories. The trolley is fitted with a pull out slide which provides a convenient stand for a recorder. The electrode systems are built into a thermostatically controlled water bath, so eliminating the need for separate water jackets and connecting tubing and at the same time allowing closer temperature control. Details of the individual units are as follows:

Bath. A small capacity stirred bath in which the electrodes are mounted and from which they can be easily removed for inspection and cleaning. An electronic system of temperature control is provided which consists of a temperature sensing resistance bridge working in conjunction with a transistorised amplifier operating the heater relay. The temperature, which may be set to any value in the range of 35°C–40°C to an accuracy of 0·2°C, or more accurately by reference to a mercury-in-glass thermometer, has a stability of 0·1°C.

pH electrode system. This is a new development which uses a direct liquid junction which is freshly formed for each sample and so avoids the uncertainties usually associated with other types of liquid junction.

Pco_2 electrode system. The electrode is based on the well known Severinghaus electrode in which the pH of a suitable electrolyte absorbed in a matrix is changed by the CO_2 from the blood and the change is detected by the pH electrode. The matrix is separated from the blood by a plastics membrane permeable to gases to prevent poisoning of the electrode. As a result of the Pco_2/pH relationship the meter calibration is logarithmic.

Po_2 electrode system. The electrode uses the normal polarographic technique in which oxygen is reduced at a polarised cathode to give a current proportional to the Po_2 of the blood. A plastics membrane permeable to gases separates the cathode from the blood and so prevents poisoning the cathode. The instrument includes a polarising supply for the electrode system and a variable scale length resistor which enables the blood gas analyser to operate with systems giving current outputs from 1×10^{-9}A to 5×10^{-6}A.

Meter. All results are read directly from a specially calibrated meter. A vibrating capacitor electrometer amplifier is used which gives a stability on the pH range within 0·005 pH in 12 hours. The amplifier includes all necessary back-off and sensitivity controls for pH, Pco_2 and Po_2 measurements and provides a polarising supply, for the Po_2 electrode system, variable between 500 and 850 mV. The large meter with anti-parallax mirror permits a discrimination on the pH range of 0·005 pH or better.

An additional input channel is provided to allow the blood gas analyser to be used for other measurements similar to pH or Pco_2. By making connections to a special plug provided, the sensitivity and back-off can be adjusted to permit these other measurements to be performed.

Calibrating gas cylinders. Provision is made for the carrying on the trolley of two 44 ft^3 gas cylinders containing known amounts of oxygen and carbon dioxide (see below), for use in calibrating the Pco_2 and Po_2 electrodes. The cylinders have sufficient capacity for about one month's continuous routine use.

(Suitable cylinders containing 5%/3½% and 10%/7% oxygen/CO_2 in nitrogen are available from B.O.C., Medical Division).

BLOOD GAS ANALYSER

(continued)

MC-600

BLOOD GAS ANALYSER, *EIL*, **Model 48C,** as specification comprising bath with pH, $P\text{co}_2$ and $P\text{o}_2$ electrode systems, direct-reading meter assembled on trolley. Includes instructions for operation and maintenance and set of equipment for initial operation as listed on the right, **but without gas cylinders.** For 110, 200, 220, 240 and 250V 50 Hz single phase supplies. Excluding installation and attendance ... ... Each £695. 0. 0. *fN*

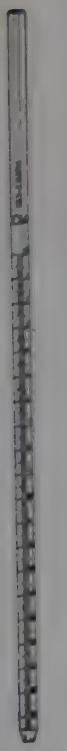
Models for 60 Hz supplies available to special order.

REPLACEMENT PARTS

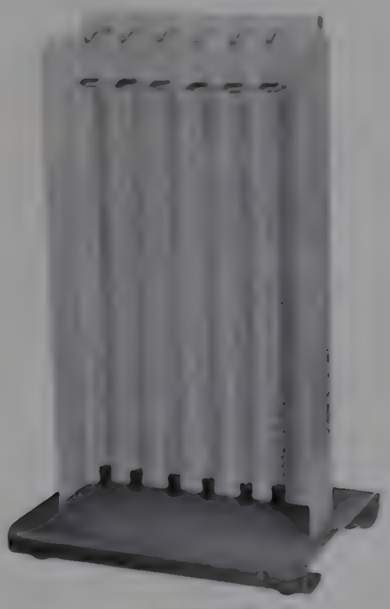
MC-610	**pH electrode system** complete ...	Each £50. 0. 0. *fN*
MC-612	$P\text{co}_2$ **electrode system** complete.	Each £50 0 0. *fN*
MC-614	$P\text{o}_2$ **electrode system** complete.	Each £50. 0. 0. *fN*

INITIAL OPERATING EQUIPMENT

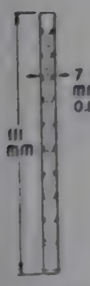
The following are supplied with the analyser:
Bottle of electrolyte for $P\text{o}_2$ electrode, 100 ml.
Bottle of electrolyte for $P\text{co}_2$ electrode, 100 ml.
Bottle of saturated potassium chloride solution, 100 ml.
Bottle of concentrated (10X) 7·416 pH buffer solution, 100 ml.
Bottle of concentrated (10X) 6 840 pH buffer solution, 100 ml.
Plastics tubing for connecting to cylinders, 4 ft.
Key for gas cylinders.
3 disposable syringes, 5 ml.
Box of tissues.
Screwdriver.
Plug, 7-pin.
2 Luer tubing adapters.
Packet of cleaners, for electrode cleaning.
Electrode spares
2 pressure regulators.
Vacuum jar.
Wander plug/coaxial socket adapter, 3 mm.
Test plug.
Jack plug for recorder.



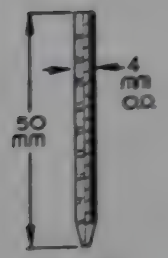
MC-670



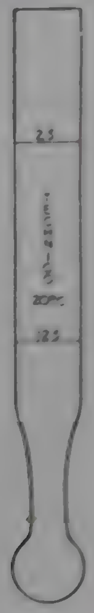
MC-670
with MC-675



MC-700



MC-705



MC-752

MC-670

BLOOD SEDIMENTATION TUBE, Westergren, *Technico.* Overall length 30 cm with top zero graduated to 20 cm at the jet, subdivided in mm. The jet is externally ground to bevel so that the lowest 5 mm graduations do not appear. To BS 2554, type 1.
Dozen £1.16. 0. Each £0. 4. 6. *a*

MC-675

METAL STAND, to suspend six Westergren tubes MC-670 or Wintrobe tubes MC-700. The tubes are suspended in special hangers which ensure that the axes of the tubes are vertical. The stand is made of stove enamelled aluminium sheet with a row of six hooks and fitted with rubber feet. Six hangers with PVC grommets and six rubber policemen are provided.
Each £3.10. 0. *b*

REPLACEMENT PARTS

MC-676	**Hanger,** with PVC grommet.	Dozen £2. 5. 0. Each £0. 5. 2. *b*
RV-180	**Rubber policemen,** int. dia. 6 mm. For price see entry in List No. sequence.	

MC-700

BLOOD SEDIMENTATION TUBE, Wintrobe, *Technico*, capillary glass. Overall length 11 cm, graduated 0 to 10 cm in 1 mm divisions, double scale. To BS 2554, type 3 ... ... Dozen £2.14. 0. Each £0. 5.10. *a*

MC-705

HAEMATOCRIT SEDIMENTATION TUBE, Overall length 5 cm with top zero, graduated in mm to the jet which is ground to a bevel.
Gross £41. 0. 0. Dozen £3.14. 0. c

MC-752

BLOOD SUGAR TUBE, Folin-Wu, *Technico*, graduated at 12·5 and 25 cm³. With 40 mm long, 8 mm diameter constricted tube leading to bulb of 4 ml capacity.
Dozen £3. 2. 0. Each £0. 6. 4. *a*

Q-BC11 with Q-MF 24/3/8

BLOOD UREA APPARATUS, Maclean, *Quickfit*, for estimation of urea in blood.

Q-2BC

CAVETT FLASK, *Quickfit*, for the micro-scale determination of alcohol in blood.

For details of above items see entries under QUICKFIT APPARATUS.

Items on this page normally available from stock except those coded *N*.

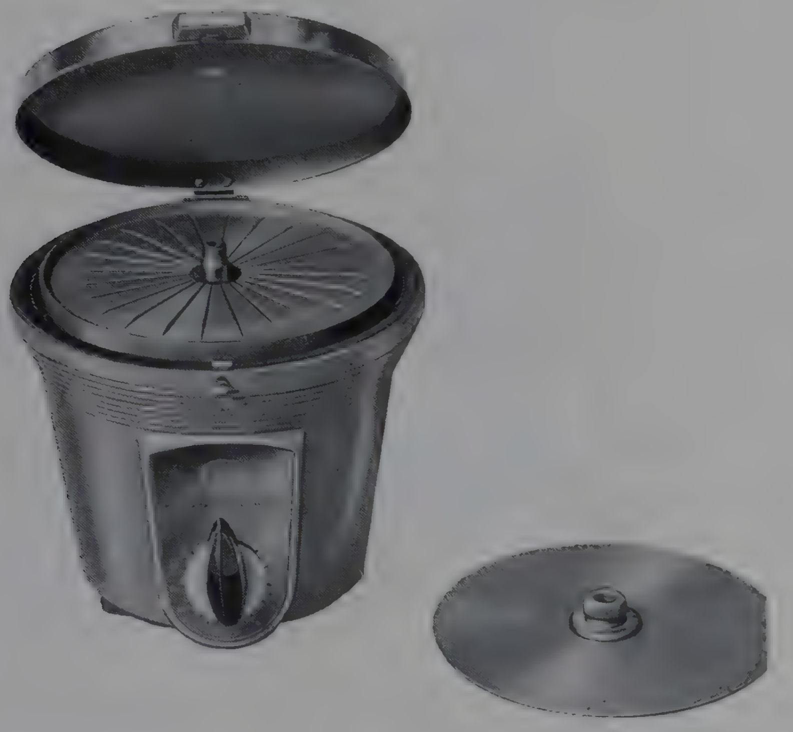
MICRO-HAEMATOCRIT CENTRIFUGE

This centrifuge is used for the determination of red blood cell volume by the micro capillary method using a speed up to 11,000 rev/min, equivalent to 12,000 g which reduces centrifuging time to a maximum of 5 minutes.

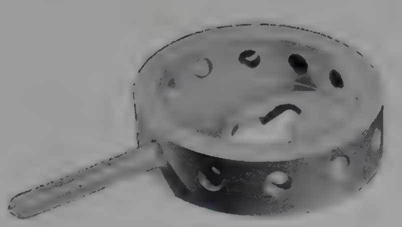
CONSTRUCTION AND CONTROLS

The centrifuge has a robust cast bowl and cover and is fitted with a quiet running universal motor which has permanently lubricated bearings.

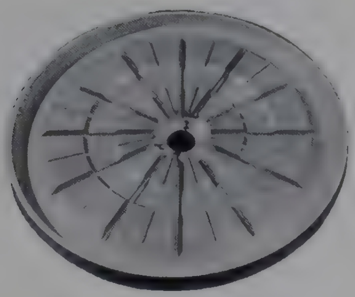
A built-in automatic timer starts the centrifuge when set to the required period which may be between 1 and 14 minutes. Operating speed is reached within a few seconds of starting and a brake is fitted for rapid retardation when required.



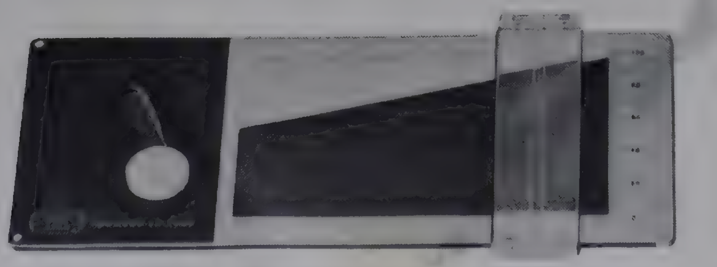
MD-010



MD-030



MD-040



MD-055

HEADS

The standard head accepts up to 24 disposable micro capillary tubes in radial numbered slots without the necessity of balancing. The head is fitted with an inner cover to reduce windage and consequent vibration.

Two alternative heads MD-030 and MD-040 are interchangeable with the standard head.

MD-010

CENTRIFUGE, MICRO-HAEMATOCRIT, *Hawksley*, as specification with standard head.

For 220/240V a.c. single phase supplies. Each **£65. 0. 0.** *f*

For 100/110V a.c. single phase supplies. Each **£65. 0. 0.** *fN*

When ordering please state voltage and nature of supply.

MD-012

CENTRIFUGE, MICRO-HAEMATOCRIT, *Hawksley*, as MD-010 but with Macrotor head MD-040.

For 220/240V a.c. single phase supplies. Each **£65. 0. 0.** *f*

For 100/110V a.c. single phase supplies. Each **£65. 0. 0.** *fN*

When ordering please state voltage and nature of supply.

ACCESSORIES for standard head

MD-020 **Capillary tubes, heparinised,** 50 µl capacity, for use with direct capillary blood. In box of 100. 10 boxes **£5. 0. 0.** Box **£0. 11. 0.** *m*

MD-022 **Capillary tubes, plain,** as MD-020 but for venous blood. 10 boxes **£3. 15. 0.** Box **£0. 8. 6.** *m*

MD-023 **Lancet, disposable,** for taking blood samples. Each lancet in sterile pack. Supplied in packs of 250. Pack **£1. 2. 6.** *f*

MD-030

HEAD, Microtor, for 12 micro tubes MD-032 at 10,000 g maximum ... ... Each **£4. 10. 0.** *f*

ACCESSORY for Microtor head

MD-032 **Tubes, polypropylene,** tapered with caps.

Capacity	400	500 µl	
Pack of 1000	£3. 15. 0.	£3. 15. 0.	*f*

MD-040

HEAD, Macrotor, for 12 micro tubes MD-032 and 12 tubes MD-042 or MD-043 ... Each **£12. 10. 0.** *f*

ACCESSORIES for Macrotor head

MD-042 **Tubes, heparinised,** as MD-020 but with tapered end and 200 µl capacity ... ... Pack of 250 **£5. 15. 0.** *f*

MD-043 **Tubes, plain,** as MD-042, but for venous blood. Pack of 250 **£4. 12. 6.** *f*

MD-032 **Tubes,** polypropylene. For details and price see entry in List No. sequence.

MICRO-HAEMATOCRIT READER

A precision capillary tube reader giving accurate readings of the percentage packed red cell volume.

A capillary tube is inserted in the carrier slot so that the base-line of the reader intersects the base of the red cells. The holder is moved so that the top line intersects the plasma-air interface. The angle of the cursor is adjusted until the white line intersects the red-white cell interface and then percentage packed red cell volume is read directly from the scale.

MD-055

MICRO-HAEMATOCRIT READER, as specification. Each **£4. 18. 6.** *f*

MD-070

CENTRIFUGE, MICRO-HAEMATOCRIT, *International* **Model MB,** and accessories, see **ADDENDA.**

Items on this page normally available from stock except those coded *N*.

Gallenkamp
REGD TRADE MARK

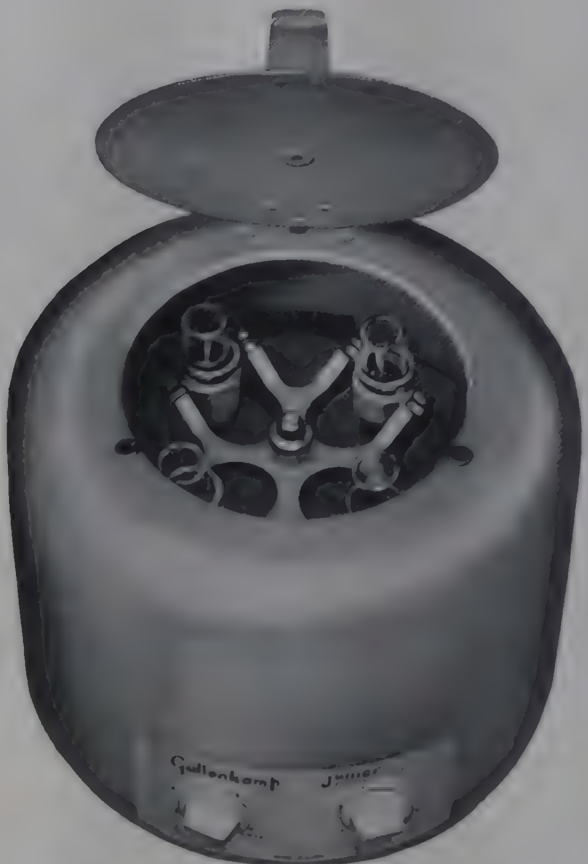
CENTRIFUGES

Semi-micro centrifuge—a low-priced machine used in colleges and medical schools in lieu of filtration for small scale separations. Speed 2000 rev/min.

Junior centrifuge—a reliable, safe, yet inexpensive centrifuge for hospital use. The flexible mountings of the motor provide **a self-balancing action.** Speed 5000 rev/min.

Universal centrifuge—a robust, large capacity, general purpose centrifuge with a range of heads, suitable for routine and research applications. Speed 5000 rev/min.

For full details of the above machine, *IEC* centrifuges, centrifuge tubes and bottles—see CF-101 et seq. in List No. sequence.



CF-405

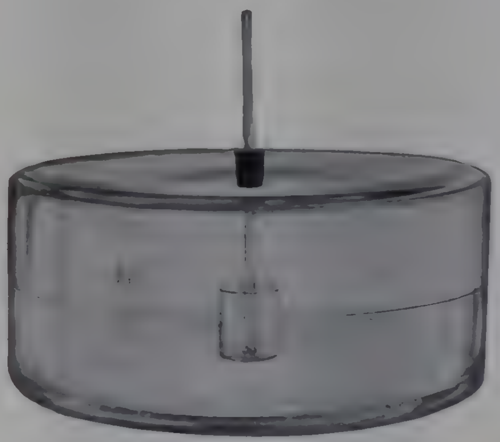
Gallenkamp
REGD TRADE MARK

CHROMATOGRAPHY APPARATUS

Chromatobags—full size chromatography tanks which can be folded up and stored in a small space. Unbreakable transparent containers, which are readily disposable when contaminated, enclose the plastics coated frameworks which support the solvent troughs and guide rods.

Chromatography columns—all glass columns, with and without water jackets, for general purpose and special medical applications.

Details of the above items and a useful range of other apparatus for column, paper, thin layer and gas chromatography—see CK-100 et seq. in List No. sequence.



CK-100

Gallenkamp
REGD TRADE MARK

COLONY COUNTER

With transistorised digital counting circuit.

For accurately counting bacterial and mould colonies in biology, botany, zoology, bacteriology, pathology and public health investigations.

Strain-free viewing is provided by bright, dazzle-free peripheral illumination over light or dark background. Contact and ink marker probes are supplied and a push-button hand switch is optionally available. The coloured marker probes enable periodic increased growth checks to be made simply and without disturbing the colonies.

Full details of the colony counter and accessories—see CX-300 et seq. in List No. sequence

Gallenkamp
COLONY COUNTER

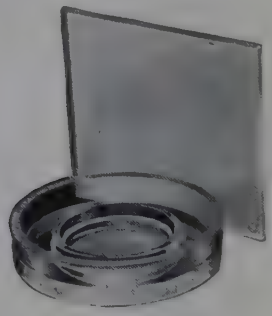
CX-300

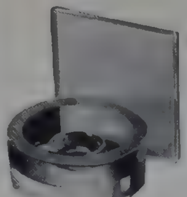
MICRODIFFUSION ANALYSIS

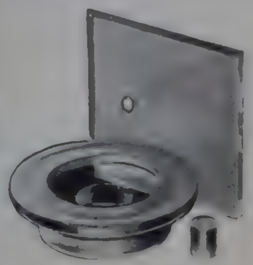
The apparatus described is used for the analysis by microdiffusion of a wide range of organic substances, particularly proteins, enzymes and other metabolic compounds. The technique, developed and described by E. J. Conway†, depends upon the absorption of a volatile component of the sample by an absorbing fluid which is later titrated.

MICRODIFFUSION DISHES

By agreement with Professor E. J. Conway we are the sole makers of Conway units and burettes with authority to use the name Conway.


MD-120

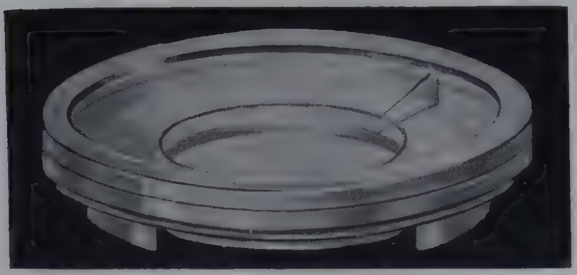

MD-125


MD-130

MD-120
MICRODIFFUSION DISH, Conway unit No. 1. The original unit, 67 mm dia. with 70 mm square glass lid, for ammonia determinations in fluids from 0·0001 mg upwards and for determining a great variety of other substances in blood and body fluids.
Dozen **£3. 2. 0.** Each **£0. 6. 4.** *b*

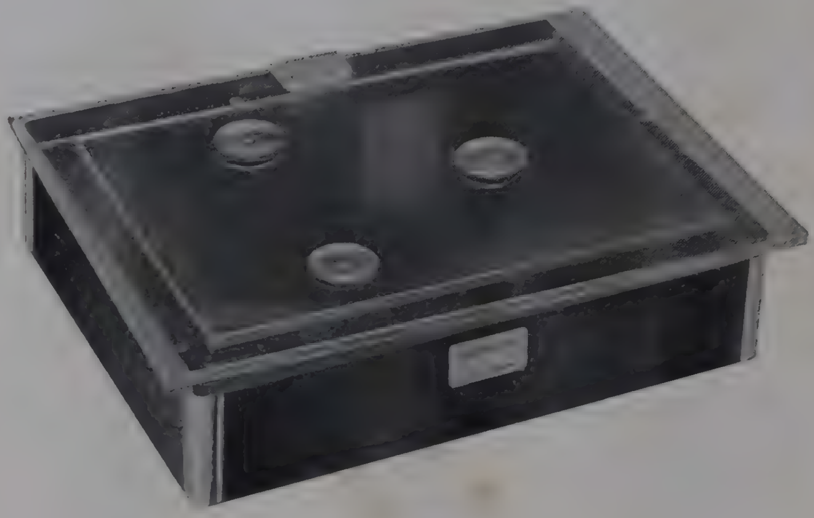
MD-125
MICRODIFFUSION DISH, Conway unit No. 2. 44 mm dia. with 46 mm square glass lid, particularly suitable for determinations of blood sugar but may also be applied to many other determinations using smaller quantities than the No. 1 unit can handle.
Dozen **£6. 5. 0.** Each **£0. 11. 3.** *b*

MD-130
MICRODIFFUSION DISH, Conway unit No. 2A. 58 mm dia. with ground flange 8 mm wide. The 60 mm square lid has a 5 mm diameter hole drilled 17 mm from one side for adding reagent. With two 10 × 10 mm glass cylinders. For precise micro carbon dioxide and bicarbonate determinations, and for blood sugar and many other microdiffusion analyses.
Dozen **£6. 15. 0.** Each **£0. 12. 3.** *b*


MD-140

MD-140
MICRODIFFUSION DISH, polystyrene, with drop-on lid. The dimensions of this semi-disposable unit have been designed to minimise the time taken for complete reaction. The material is sufficiently wettable not to require the use of a wetting agent. The thin, clear, colourless base makes the unit very suitable for absorptiometric techniques. Outside diam. 64 mm × max. internal depth 10 mm.
Dozen **£1. 17. 0.** Each **£0. 4. 6.** *c*

OSCILLATING TABLE


MD-150

OPERATION

This table designed in conjunction with Dr. W. M. Dale, comprises two glass plates, one supported above the other by three steel balls. When the uppermost plate, on which the units are placed, is deflected and released, it oscillates freely in all directions in the horizontal plane and slightly in the vertical plane. This produces the necessary agitation of the contents of up to twelve microdiffusion dishes.

CONSTRUCTION

The two glass plates each have three depressions in which the ball bearings are centred. The lower plate is secured to a black plastics plinth which houses a small synchronous geared unit driven at 4 rev/min. An adjustable spring arm fixed to the gear unit periodically strikes a peg carried by the upper glass plate and thus sets the table in motion. The mechanism is completely silent and consumes only 6W. To prevent the units or dishes slipping off the table, the top plate is fitted with a raised rubber edge.

DIMENSIONS

Top plate	30 × 24 cm
Bottom plate	25 × 18 cm
Plinth	23 × 28 × 6·5 cm

MD-150
OSCILLATING TABLE, *Gallenkamp*, as specification. With spare ball bearings. For single phase supplies.

For 200/250V 50 Hz supplies	...	Each	**£29. 10. 0.**	*b*
For 100/130V 50 Hz supplies	...	Each	**£29. 10. 0.**	*bN*

REPLACEMENT PARTS

MD-152	**Glass plates,** pair to match	...	Pair	**£6. 5. 0.**	b
MD-154	**Steel balls,** $\frac{5}{32}$ in diameter	...	Per 25	**£0. 2. 6.**	b

CONWAY BURETTE

Recommended for use with microdiffusion dishes see BW-786 in List No. sequence.

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† 'Microdiffusion Analysis and Volumetric Error' by Edward J. Conway, F.R.S., M.B., D.Sc., Professor of Biochemistry, University College, Dublin.

Items on this page normally available from stock except those coded *N*.

Gallenkamp
REGD TRADE MARK

COLORIMETER

For a wide range of colorimetric determinations with blood, urine and other body fluids in clinical and biochemical laboratories.

- Transistorised stabiliser circuit.
- Rapid response—stable readings.
- Mirror scale reads optical density direct.
- Polypropylene 3-position cell holder.
- Simple to operate and maintain.
- Optional flow through cell.

Accuracy—about 1% by direct reading; better with calibration curve.

Stability—total drift over long periods less than 0·005 o.d. units after 10 minute warm-up period.

Sample heating—only about 5°C over a period of 2 hours.

Available with a range of colour filters, test cells, cell holders and adapters.

See CS-200 et seq. in List No. sequence.

Gallenkamp COLORIMETER

CS-200

Gallenkamp
REGD TRADE MARK

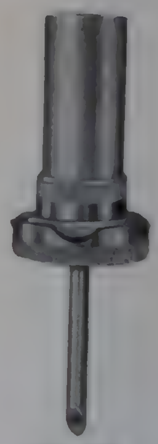
BACTERIOLOGICAL FILTER HOLDERS

For membrane filtration using 5 cm Oxoid membrane filters. Used in bacteriology, virology and mycology, and in testing clinical fluids including blood, urine, spinal fluids, and gastric and pleural washings.

In a typical bacteriological test the filter holder and membrane are sterilised. For each sample a fresh, sterile membrane is inserted into the holder and the sample is rapidly filtered by the application of suction or pressure. The membrane is then transferred to a Petri dish containing nutrient and incubated.

Also available, high pressure membrane filter holders, filter mat holders and a range of FRITTED GLASS FILTERS for bacteriological and tissue work and for gas washing and distribution.

See FD-350 et seq. in List No. sequence.



FD-350

FD-440

Gallenkamp
REGD TRADE MARK

FLAME ANALYSER

For rapid, accurate determinations of sodium and potassium in serum, plasma, urine and other fluids, and in plant and animal tissues.

- Accurate readings in 5 seconds.
- Sodium 2 ppm full scale.
- Potassium 5 ppm full scale.
- Immediate operation—no warm up period.
- Operates on town gas and most commercial gases.
- Simple to operate and maintain.

Accuracy—about 1% full scale; better with the mean of several readings.

Samples—only 0·5 ml per reading; uptake rate 4 ml/min.

Breakthrough—normally less than 3% breakthrough from a 100-fold excess of interfering cation.

Available with optional interference filter for calcium—fits into the flick-change turret.

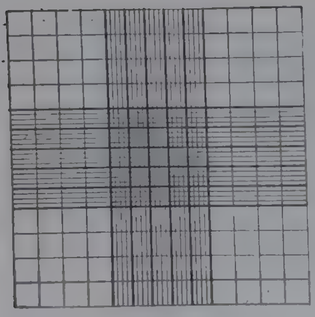
See FH-500 et seq. in List No. sequence.

FH-500

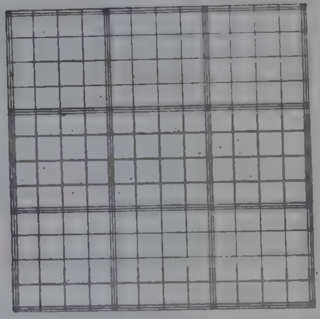
HAEMACYTOMETERS

MD-200, MD-206
MD-220, MD-226
MD-230, MD-236

MD-210
MD-216



Improved Neubauer Ruling



Modified Fuchs-Rosenthal Ruling

MD-320

COUNTING CHAMBER, Helber, circular cell with depth of 0·02 mm, with Thoma ruling. Slide thickness 1 mm ... ... Each **£4. 0. 0.** *f*

MD-200

HAEMACYTOMETER, to BS 748, *Cristalite*, with **rhodium coated** counting chamber giving bright lines against a neutral grey background. Double cell chamber with improved Neubauer ruling where the cell depth over the ruled areas is 0·1 ±0·001 mm. With plane cover glasses, one red and one white cell pipette each with tubing and mouthpiece, in aluminium alloy case. Each **£6. 7. 6.** *f*

MD-206

HAEMACYTOMETER, to BS 748, *Cristalite*, as MD-200 but with modified Fuchs-Rosenthal ruling, chamber depth of 0·2 ±0·001 mm and two white cell pipettes. Each **£6. 7. 6.** *f*

REPLACEMENT PARTS

MD-210 **Counting chamber, rhodium coated,** with improved Neubauer ruling, complete with cover glasses. Each **£4. 7. 6.** *f*

MD-216 **Counting chamber, rhodium coated,** with modified Fuchs-Rosenthal ruling, complete with cover glasses. Each **£4. 7. 6.** *f*

Pipettes and cover glasses, see below.

MD-220

HAEMACYTOMETER, to BS 748, comprising a BS single cell counting chamber with improved Neubauer ruling, with chamber depth 0·1 ±0·001 mm. Two plane cover glasses, one red and one white cell pipette each with tubing and mouthpiece, in fitted case. Each **£4. 10. 0.** *f*

MD-226

HAEMACYTOMETER, to BS 748, as MD-220, but with modified Fuchs-Rosenthal ruling, chamber depth of 0·2 ±0·001 mm and two white cell pipettes. Each **£4. 10. 0.** *f*

MD-230

HAEMACYTOMETER, to BS 748, comprising a BS double cell counting chamber with improved Neubauer ruling, two plane cover glasses, one red and one white cell pipette each with tubing and mouthpiece, in fitted case ... ... Each **£5. 12. 6.** *f*

MD-236

HAEMACYTOMETER, as MD-230, but with modified Fuchs-Rosenthal ruling and two white cell pipettes. Each **£5. 12. 6.** *f*

REPLACEMENT PARTS

Counting chambers, complete with cover glasses.

Type	Single			Double		
List No.	Ruling	Each	List No.	Ruling	Each	
MD-250	Improved Neubauer	£2. 10. 0.	**MD-260**	Improved Neubauer	£3. 12. 6.	*f*
MD-256	Modified Fuchs-Rosenthal	£2. 10. 0.	**MD-266**	Modified Fuchs-Rosenthal	£3. 12. 6.	*f*

ME-386 **Pipette,** red cell, giving dilution 1 in 100 ... ...
ME-388 **Pipette,** white cell, giving dilution 1 in 10... ... ...
} For prices see entries in List No. sequence.

***MD-274** **Cover glasses,** optically plane, for single cell counting chamber. Dimensions 16 × 22 mm, thickness 0·4 mm ... ... Pack of 10 **£1. 0. 10.** *m*

***MD-276** **Cover glasses,** optically plane, for double cell counting chamber. Dimensions 22 × 25 mm, thickness 0·4 mm ... ... Pack of 10 **£1. 0. 10.** *m*

All items on this page normally available from stock.

Gallenkamp

ANHYDRIC INCUBATORS

General purpose incubators with accurate temperature control, for culture growth in the fields of biology and microbiology, bacteriology, virology and epidemiology, pathology and biochemistry.

- Accurate temperature control.
- Uniform temperature throughout work space.
- Controlled ventilation.

Specimens can be left, with complete confidence, to incubate—should anything go wrong, the SAFETY THERMOSTAT takes over!

Available in three popular sizes.

See IH-100 in List No. sequence.

The Incubators Section includes such well known apparatus as the **Cooled Incubator** (0° to 45°C), the **Shaking Incubator** for metabolic studies and the **Orbital Incubator** which accommodates up to 36 × 250 ml flasks.

Full details—see IH-330 et seq. in List No. sequence.

IH-100

Gallenkamp

SHAKING INCUBATORS

For growing cultures of microorganisms and tissue cells under controlled conditions of temperature and agitation.

SHAKING INCUBATOR (WATER BATH)

- Temperatures up to 80°C (control 0·1°C).
- Speed variable from 50 to 200 oscillations/min.
- Interchangeable racks.
- Provision for anaerobic working.

Typical load—50 × 25 ml conical flasks.

ORBITAL INCUBATOR (AIR BATH)

- Temperatures up to 50°C (control 0·1°C).
- Speed variable from 30 to 280 orbits/min.
- Interchangeable racks.
- For use with air and other atmospheres.

Typical load—36 × 250 ml conical flasks.

Both of these machines incorporate robust, heavy mechanisms, enabling prolonged tests to be carried out **with confidence.** Hundreds of them are in use throughout the world!

Full details—see IH-350 to IH-450 in List No. sequence.

IH-350

Gallenkamp

MANIPULATOR GLOVE BOX

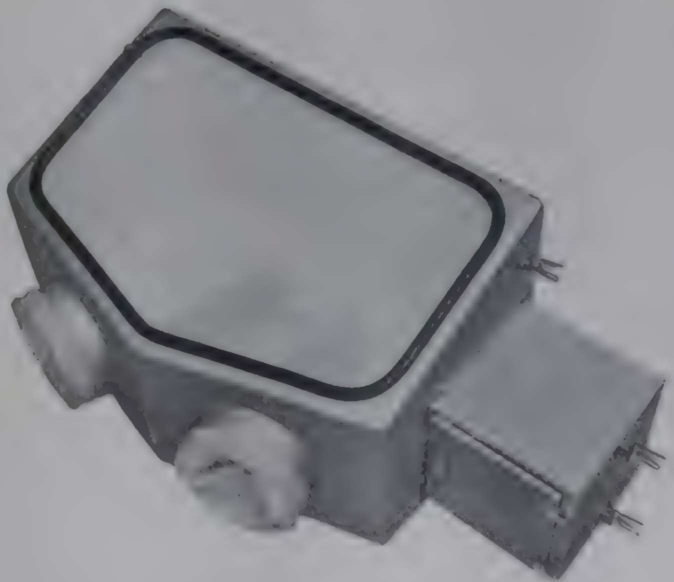
With automatic air-lock loading hatch.

Originally developed for handling radioisotopes having a relatively low level of activity, this manipulator glove box has many applications in other, including medical, fields.

Toxic materials may be handled (ground, stirred, filtered, gently heated, etc.) without danger from airborne particles; hygroscopic substances can be handled without difficulty and operations where it is necessary to exclude air, or work under dust free conditions, are possible with the apparatus. In work involving bacteria, viruses, biological or pathological specimens and so on, it makes possible protection of the specimen from the operator and vice versa. The loading hatch is in the form of an automatic air-lock with two airtight doors interconnected by a neat interlocking system to prevent either being opened until the other is correctly shut.

See MA-950 et seq. in List No. sequence.

Also available, Pathological Manipulator Cabinet with built-in exhaust fan—see MA-980.



MA-950

Technico

REGD. TRADE MARK

SELIGSON AUTOMATIC DILUTION PIPETTES

For the rapid, quantitative dilution of liquid samples in routine analytical and clinical work.

- **Three models cover dilution ranges 1 : 5 to 1 : 250**
- **Self rinsing action; no cleaning required between successive samples**
- **Auto zero burette for diluent volume**

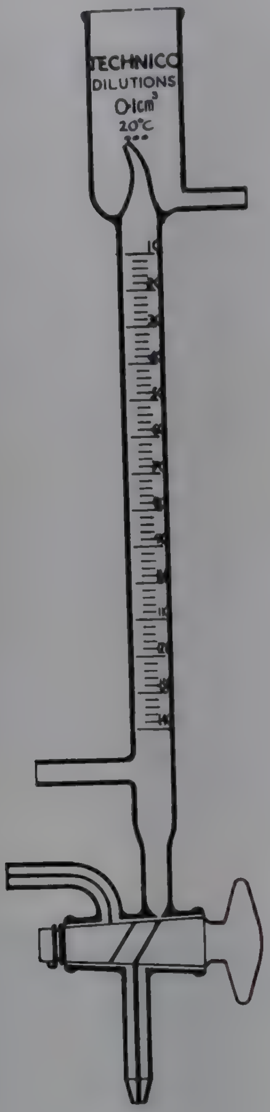
OPERATION

The precisely calibrated jet of the dilutor is filled with sample by opening the stopcock to the capillary side tube and applying gentle suction. The burette is filled with diluent through the filling tube until excess flows from the top tube and is drained away. By rotating the stopcock through half a turn, the diluent discharges through the jet, washing out with it the sample. The dilution ratio is measured directly on the burette scale. Rotating the stopcock yet once more, the next sample may be drawn into the rinsed jet ready for dilution, and so on.

ME-230

PIPETTES, Seligson dilution, *Technico*, as specification, borosilicate glass.

Jet capacity		0·05	0·1	0·2cm³	
Dilution	from	1:20	1:10	1:5	
	to	1:250	1:140	1:70	
Subdivided		5	2	1	
Dozen		**660/–**	**660/–**	**720/–**	*a*
Each		**60/–**	**60/–**	**66/–**	



ME-230

PIPETTES, automatic dispensing, see PM-664 to PM-764 in List No. sequence.

AUTOMATIC DILUTION APPARATUS

ME-240

LIQUID DILUTER, automatic, *Auto-Diluter*. A self contained instrument capable of rapidly performing dilution of liquid samples from 0·02 to 0·2 cm³ in either 1 to 5 cm³ or 4 to 10 cm³ of diluent with a reproducibility within ± 1%. The instrument uses a motorised nylon syringe for the diluent and a stainless steel syringe for the sample. A stainless steel valve, which prevents liquid flowing back into the syringes, causes sample and diluent to be drawn from their respective containers and discharged in turn from the delivery tube. In this way, each sample is followed by a relatively large volume of diluent which washes the delivery tube and so prevents carry-over of sample. A Perspex window permits the syringe mechanism to be seen in operation. The liquid inlet nozzle takes 3 mm bore thin wall tubing. The outlet nozzle is fitted with a compression coupling to grip heavier wall tubing which it has been found essential to achieve maximum reproducibility of dilutions. A press button for single cycle operation and an adapter for connecting a foot switch are also provided. Overall dimensions 25×13×13 cm. Weight 2·5 kg. Complete with one nylon syringe and instructions for use. For 200/250V 50 Hz supplies.

Diluent syringe capacity	5 cm³	10 cm³	
Sample syringe capacity	0·15 cm³	0·15 cm³	
Each	**£39. 10. 0.**	**£39. 10. 0.**	*fN*

A glass diluent syringe can be fitted to special order.

REPLACEMENT PARTS AND ACCESSORIES

PM-766	**Foot switch assembly**	For prices see entries in List No. sequence.
PM-768	**Syringes, nylon, 5 and 10 cm³** ...	
TX-772	**Tubing, PVC, 3 mm bore**	

AUTO-DILUTER
OUTLET
INLET

ME-240

Items on this page normally available from stock except those coded *N*.

Technico PIPETTES

REGD. TRADE MARK

FOR SEROLOGICAL PURPOSES

DE-120

PIPETTE, *Technico,* straight pattern with two marks to deliver 0·5 and 1 cm³. For price see entry in List No. sequence.

ME-260

PIPETTES, serological, *Technico,* with fast jet calibrated to tip for blow-out of last drop.

To deliver	0·1	0·2	1	1	2 cm³	
Subdivided in	0·01	0·01	0·01	0·1	0·02 cm³	
Flow time	3–5	3–5	4–8	4–8	4–8 sec	
Dozen	**74/–**	**78/–**	**43/–**	**48/–**	**40/–**	*a*
Three	**19/6**	**20/6**	**11/3**	**12/9**	**10/6**	
Each	**7/4**	**7/8**	**5/–**	**5/4**	**4/9**	

ME-262

PIPETTES, serological, *Technico,* as ME-260 but with reduced diameter suction stem above the top mark.

To deliver	5	5	10 cm³	
Subdivided in	0·05	0·1	0·1 cm³	
Flow time	4–8	4–8	6–10 sec	
Dozen	**40/–**	**46/–**	**46/–**	*a*
Three	**10/6**	**12/3**	**12/3**	
Each	**4/9**	**5/2**	**5/2**	

ME-350

PIPETTES, serological, *Corex,* strengthened glass. See entry in List No. sequence.

ME-270

PIPETTES, blood and opsonic index, *Technico,* with white enamel back and nipple fitting for rubber teat. Calibrated with mercury to contain an accurate volume of blood which must be completely washed out in use. All sizes with 100 subdivisions.

To contain	0·05	0·1	0·2	0·5	1 cm³	
Dozen	**70/–**	**70/–**	**70/–**	**70/–**	**70/–**	*a*
Three	**18/6**	**18/6**	**18/6**	**18/6**	**18/6**	
Each	**7/–**	**7/–**	**7/–**	**7/–**	**7/–**	

ME-292

PIPETTES, blood sugar, *Technico,* graduated with two marks to contain, with white enamel back and nipple fitting for rubber teat.

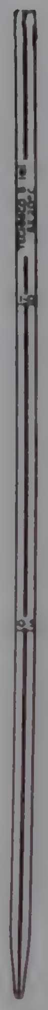
To contain	0·1	0·2 cm³	
Subdivided at	0·05	0·1 cm³	
Dozen	**68/–**	**68/–**	*a*
Three	**18/–**	**18/–**	
Each	**6/10**	**6/10**	

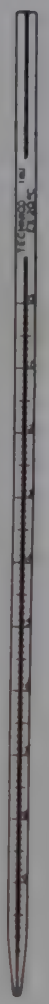
ME-294

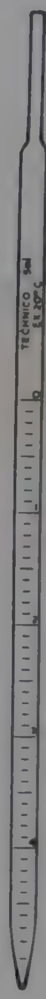
PIPETTE, Ellerman, blood sugar, *Technico,* as ME-292 but with three marks to contain 10, 20 and 25 mm³.
Dozen **£3. 2. 0.** Three **£0. 16. 6.** Each **£0. 6. 4.** *a*

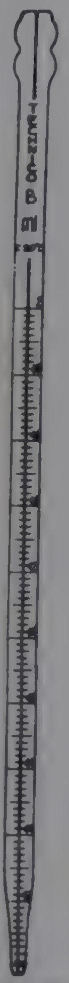
ME-300

PIPETTE, Maclean, *Technico,* for blood sugar, with white enamel back, graduated to contain 0·2 cm³.
Dozen **£3. 18. 0.** Three **£1. 0. 6.** Each **£0. 7. 8.** *a*


DE-120


ME-260


ME-262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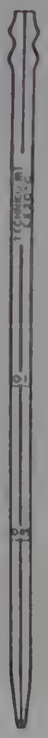
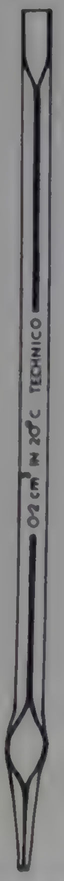

ME-292

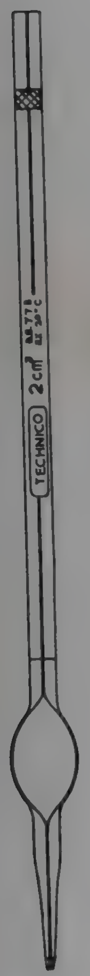


ME-300

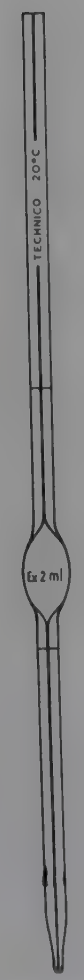
All items on this page normally available from stock.

Technico PIPETTES

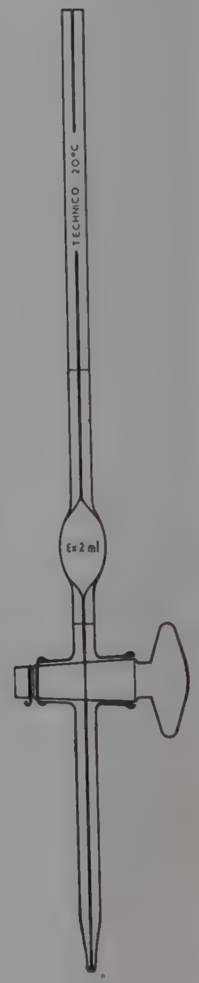
REGD. TRADE MARK



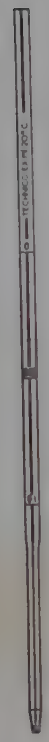
ME-320



ME-340



ME-342



ME-344

ME-320

PIPETTES, Ostwald-Folin, to BS 773, *Technico,* calibrated to contain.

To contain	0·2	0·5	1	2	3 cm³	
Dozen	82/–	82/–	84/–	96/–	100/–	*a*
Each	7/10	7/10	8/–	9/–	9/3	

ME-322

PIPETTES, Ostwald-Folin, to BS 773, *Technico,* with works certificate, calibrated to contain.

To contain	0·2	0·5	1	2	3 cm³	
Dozen	165/–	165/–	170/–	180/–	185/–	*a*
Each	15/–	15/–	15/6	16/6	17/–	

ME-330

PIPETTES, Ostwald-Folin, to BS 773, *Technico,* calibrated to deliver.

To deliver	0·2	0·5	1	2	3 cm³	
Dozen	82/–	82/–	84/–	96/–	100/–	*a*
Each	7/10	7/10	8/–	9/–	9/3	

ME-332

PIPETTES, Ostwald-Folin, to BS 773, *Technico,* with works certificate, calibrated to deliver.

To deliver	0·2	0·5	1	2	3 cm³	
Dozen	165/–	165/–	170/–	180/–	185/–	*a*
Each	15/–	15/–	15/6	16/6	17/–	

***ME-375**

PIPETTES, Ostwald-Folin, *Corex,* strengthened glass, see entry on opposite page.

ME-340

PIPETTES, Ostwald-Van Slyke, *Technico,* to deliver between two graduations, the lower mark being high enough to permit reading when pipette is inserted into the reaction pipette cup of a Van Slyke apparatus.

To deliver	0·2	0·5	1 cm³	
Dozen	125/–	130/–	135/–	*a*
Each	11/3	11/9	12/3	
To deliver	2	3	5 cm³	
Dozen	140/–	140/–	140/–	*a*
Each	12/9	12/9	12/9	

ME-342

PIPETTES, Ostwald-Van Slyke, *Technico,* as ME-340 but with stopcock.

To deliver	0·2	0·5	1 cm³	
Dozen	195/–	200/–	210/–	*a*
Each	17/6	18/–	19/–	
To deliver	2	3	5 cm³	
Dozen	215/–	215/–	215/–	*a*
Each	19/6	19/6	19/6	

PIPETTE, Ostwald-Van Slyke, three mark, opal backed, *Technico,* for use with the Van Slyke apparatus. Graduated to deliver 0·05 or 0·1 cm³ between marks, the lowest mark is high enough to permit the reading to be made when the pipette is inserted into a reaction pipette. The waste volume is kept to a minimum by the use of fine bore capillary tubing below the lower mark.

ME-344

PIPETTE, Ostwald-Van Slyke, *Technico,* **without stopcock** ... Dozen **£9. 0. 0.** Each **£0. 16. 6.** *a*

ME-346

PIPETTE, Ostwald-Van Slyke, *Technico,* **with stopcock** ... Dozen **£14. 0. 0.** Each **£1. 5. 6.** *a*

All items on this page normally available from stock.

COREX® PIPETTES

Manufactured by the Corning Glass Works, Corning, New York, U.S.A.

Corex® is the Corning U.S.A. trademark for laboratory glassware made from a special type of glass and treated by a chemcor ion-exchange process which strengthens the glass chemically so that it becomes many times stronger than ordinary glassware.

It has much greater surface hardness than ordinary glass and is so better able to resist the scratching and chipping which weaken ordinary glass and are a major cause of breakage, as well as constituting a danger from cross-contamination.

Corex is far more resistant to chemical attack than ordinary borosilicate, will withstand repeated steam sterilisation without visible clouding, and can be used up to 300°C without damage.

Corex pipettes are manufactured to a very high quality to American specifications which are on the whole very similar to the corresponding British Standards although there are some differences in sizes and a number of minor differences in dimensions and volumetric tolerances. In accordance with American practice, pipettes to class A accuracy are so designated, it being understood that other pipettes without designation are class B accuracy. The limit of error applicable to each pipette is shown so that the purchaser can compare with the corresponding British Standard if desired. Graduations and inscriptions are as permanent as the glass itself and will remain sharply legible throughout the whole long life of the pipettes.

Gallenkamp is the appointed Distributor of Corex laboratory glassware in the United Kingdom.

***ME-350**

PIPETTES, short tip serological, *Corex* 7085A, with permanently marked graduations from zero line at top down to full capacity at tip of jet.

To deliver	0·1	0·2	1	1 cm³	
Subdivided	0·01	0·01	0·1	0·01 cm³	
Limit of error	0·005	0·008	0·02	0·02 cm³	
Pack of 12	**310/–**	**340/–**	**300/–**	**310/–**	*d*
Each	**28/–**	**31/–**	**27/6**	**28/–**	
To deliver	2	2	5	10 cm³	
Subdivided	0·1	0·01	0·1	0·1 cm³	
Limit of error	0·02	0·02	0·04	0·06 cm³	
Pack of 12	**340/–**	**450/–**	**360/–**	**390/–**	*d*
Each	**31/–**	**41/–**	**33/–**	**35/–**	

For similar *Corex* pipettes with long tip or Mohr type, see PM-430, PM-435 in List No. sequence.

***ME-352**

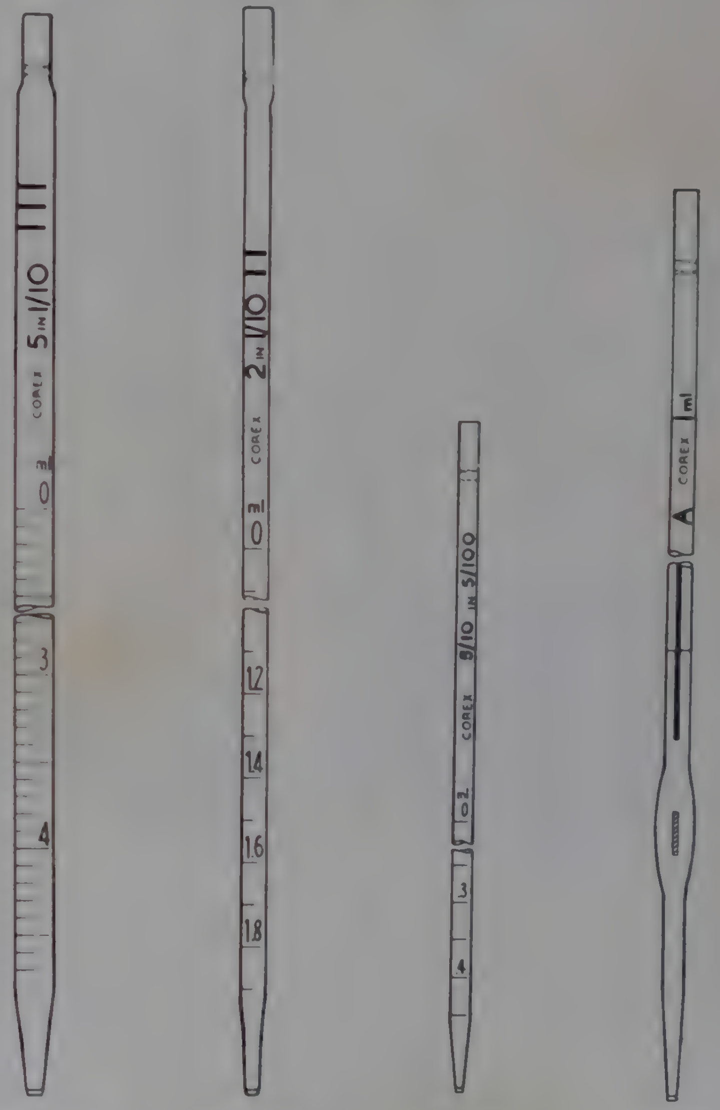
PIPETTES, serological, cotton plug, *Corex* 7086A, with permanently marked graduations from zero line at top down to full capacity at tip of jet.

To deliver	0·1	0·2	1	1 cm³	
Subdivided	0·01	0·01	0·1	0·01 cm³	
Limit of error	0·005	0·008	0·02	0·02 cm³	
Pack of 12	**360/–**	**390/–**	**285/–**	**310/–**	*d*
Each	**33/–**	**35/–**	**26/–**	**28/–**	
To deliver	2	2	5	10 cm³	
Subdivided	0·1	0·01	0·1	0·1 cm³	
Limit of error	0·02	0·02	0·04	0·06 cm³	
Pack of 12	**350/–**	**490/–**	**370/–**	**390/–**	*d*
Each	**32/–**	**45/–**	**34/–**	**35/–**	

***ME-365**

PIPETTES, serological, V.D.R.L., *Corex* 7093A, with permanently marked graduations. Short 20 cm pipettes for performing V.D.R.L. tests for syphilis and other tests using spot plate and ring agglutination slides. For delivery from zero line at top down to full capacity at tip of jet.

To deliver	0·5	0·5 cm³	
Subdivided	0·01	0·05 cm³	
Limit of error	0·01	0·01 cm³	
Pack of 12	**340/–**	**320/–**	*d*
Each	**31/–**	**29/–**	



ME-350 **ME-352** **ME-365** **ME-375**

***ME-375**

PIPETTES, Ostwald-Folin, Class A, *Corex* 7105A, with permanently marked graduations.

To deliver	0·5	1	2 cm³	
Limit of error	0·006	0·006	0·006 cm³	
Pack of 12	**310/–**	**320/–**	**320/–**	*d*
Each	**28/–**	**29/–**	**29/–**	

For *Corex* bulb (transfer) pipettes, see PM-460 in List No. sequence.

All items on this page normally available from stock.

ME-380
PIPETTE, DROPPING, Dreyer, with capillary tip and rubber teat.
Dozen **£3. 8. 0.** Each **£0. 6.10.** *a*

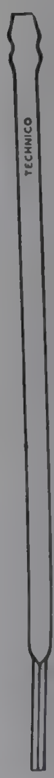
RV-220 Teats, spare for above, see entry in list No. sequence.

ME-386
PIPETTE, haemacytometer, to BS 748. For red cells, giving dilution 1 in 100.
Dozen **£6.12. 0.** Each **£0.12. 2.** *m*

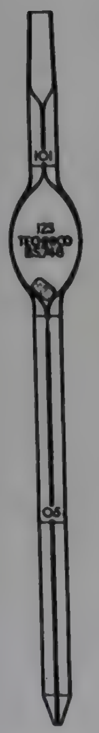
ME-388
PIPETTE, haemacytometer, to BS 748. For white cells, giving dilution 1 in 10.
Dozen **£6.12. 0.** Each **£0.12. 2.** *m*

ME-390
PIPETTES, haemoglobinometer, with mouthpiece and rubber tubing.

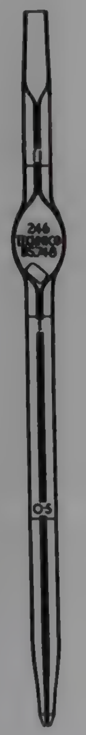
Capacity	20	40	50 mm³	
Dozen	**59/–**	**59/–**	**59/–**	*m*
Each	**5/5**	**5/5**	**5/5**	



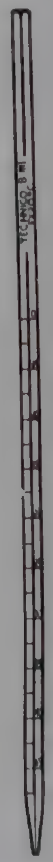
ME-380

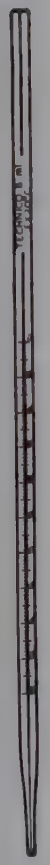


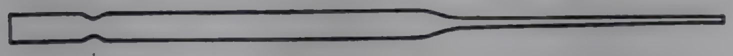
ME-386

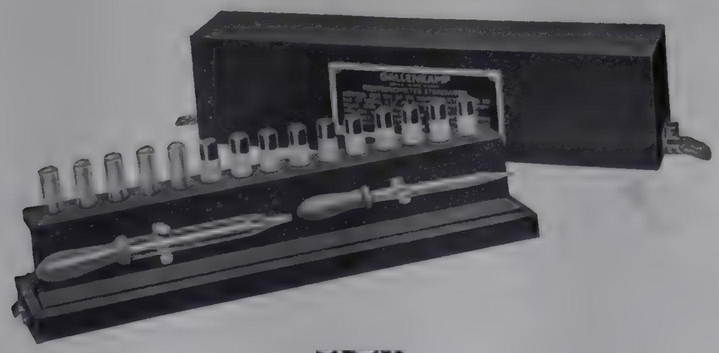


ME-388


ME-400


ME-430


ME-440



ME-450

ME-400
PIPETTES, Kahn, *Technico,* graduated to deliver. Overall length 350 mm.

To deliver	0·2	0·25	0·45	1·5 cm³	
Subdivided in	0·001	0·0125	0·15	0·05 cm³	
Dozen	**90/–**	**80/–**	**86/–**	**80/–**	*a*
Each	**8/6**	**7/10**	**8/3**	**7/10**	

ME-430
PIPETTES, Warburg, *Technico,* graduated with extra long jets, for use with Warburg flasks.

Capacity	0·1	0·2	0·5	1 cm³	
Subdivided in	0·001	0·002	0·005	0·01 cm³	
Dozen	**86/–**	**86/–**	**80/–**	**76/–**	*e*
Each	**8/3**	**8/3**	**7/10**	**7/6**	

ME-435
PIPETTES, MICRO, 0·02 ml, heparinised disposable. Precision break-off capillary tubes for accurate dilutions. Ref: LEWIS & BENJAMIN, J. Clin. Path. (1965), **18,** 689.
Ten boxes of 100 **£15. 0. 0.** *m*
Single box each **£1. 13. 0.**

DISPOSABLE DOSING PIPETTES

These capillary Pasteur pipettes enable blood, serum and other biological fluids to be transferred under perfectly sterile conditions. They have a constriction in the neck to act as a stop for the cotton wool plug, and to facilitate their being carried horizontally when filled. Being machine made and uniform, they have a virtually reproducible volume per drop.

ME-440
DOSING PIPETTE, uncalibrated, short form, length 5¾ in (14·5 cm). Approx. 30 drops per ml.
Case of 10 gross **£12. 0. 0.** *m*
Box of 2½ gross **£3. 6. 0.**

ME-442
DOSING PIPETTE, uncalibrated, long form, length 9 in (22·5 cm). Approx. 33 drops per ml.
Case of 10 gross **£13.14. 0.** *m*
Box of 2½ gross **£3.12. 6.**

Hempel-Van Slyke pipette see MC-521 in List No. sequence.

Pipette shaker see ME-530 in List No. sequence.

Plates for agglutination, blood grouping and other tests see **PLATES.**

PROTEINOMETER STANDARDS

ME-450
PROTEINOMETER STANDARDS SET, for the turbidimetric estimation of albumen in urine, CSF and other body fluids. Comprises 10 sealed and labelled albumen standards covering the range from 10 to 100 mg/100 ml and 5 sample tubes. These tubes of 1 cm internal diameter are mounted in a comparator block which has an anodised aluminium plate with a central black band running the whole length of the plate to aid the visual comparison of sample and standard. Supplied with one 1 ml and one 3 ml dropping pipette attached to the wooden block by spring clips, and cover with anodised instruction plate. **Without sulpho-salicylic acid.**
Each **£6.10. 0.** *b*

REPLACEMENT PART
ME-452 Tubes, sample, for above.
Dozen packs **£6.10. 0.** Pack of 12 **£0.11. 9.** *c*

Reference: E. J. King and H. Wiggins, 2nd International Congress of Biochemistry, Paris, 1952, Resumé de Communications, p. 352.

All items on this page normally available from stock.

Gallenkamp
REGD TRADE MARK

OVEN/STERILISERS

- Excellent temperature control—efficient insulation.
- Modern appearance with built-in controls.
- Long-life heaters.
- All-steel parts rustproofed or stainless.

HOTBOX ovens with extra large shelves to accommodate pipette sterilising boxes.

ECONOMY ovens available with toughened plate glass door, provides reasonable performance at economical price.

BS ovens for use where **extremely** high performance standards are required within the specification of BS 2648.

Also forced air DRYING CABINET, HEAVY DUTY OVENS, etc. See OV-010 et seq. in List No. sequence.

OV-010

Gallenkamp
REGD TRADE MARK

POTENTIOMETRIC MICROTITRATION APPARATUS

For the multiple, routine determination of chloride ion in plasma, serum, CSF, urine and other biological fluids, and for the determination of salinity.

Designed in cooperation with Professor I. D. P. Wootton, Ph.D., M.A., M.B., B.Chir., F.R.I.C.

- Only 0·2 ml sample used.
- Results in mE/litre.
- 1% routine accuracy.
- Requires only two standard solutions—no indicators.
- Rapid and convenient in use.

See EJ-930 et seq. in List No. sequence.

Also available general purpose electrochemical TITRATION STAND with magnetic stirrer base and combined burette and electrode holder for most electrodes—see EJ-920 et seq.

EJ-930

Gallenkamp
REGD TRADE MARK

RESPIRATORY GAS ANALYSERS

LLOYD GAS ANALYSER

The Lloyd Gas Analyser incorporates many advanced design features and, unlike traditional absorption apparatus, is both portable and very accurate. A complete O_2/CO_2 analysis can be performed in five minutes to an accuracy of 0·02% V.V.

Virtually all potential errors are eliminated including those due to faulty manipulation, leaky joints, and changes in ambient pressures and temperatures.

The apparatus is ideal for multiple routine determinations and accessory pipettes are available for a range of gas component determinations by techniques including combustion.

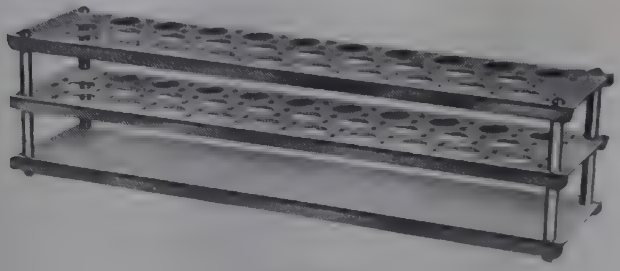
Suitable for O_2, CO_2, CO, H_2, CH_4, C_2H_6, N_2O and other unsaturated gases.

See GC-400 et seq. in List No. sequence.

Also available, a range of Orsat Gas Analysers and accessories—see GC-020 et seq. and Haldane Gas Analysers to BS 1756 Part 3 and a portable version—see GC-350 et seq. in List No. sequence.

GC-412

KAHN RACKS



ME-480

ME-480

KAHN RACK, nickel plated brass, with 30 holes 14 mm dia. to take Kahn or culture tubes which are held in position by nickel silver wire springs. These racks may be used in shaking machines for Kahn tests or vertically in incubators with culture tubes. Dimensions 7·5× 29×7 cm ... Dozen **£29. 0. 0.** Each **£2. 12. 0.** *bS*

TF-104

TUBE, for **Kahn test,** soda-lime glass 75×12 mm, see entry in List No. sequence.

Kahn rack shaker see SD-130 in List No. sequence.

SHAKING MACHINE

ME-530

ME-530

SHAKER, PIPETTE, for shaking haemacytometer pipettes and Kahn tubes, This machine ensures that blood corpuscles are evenly mixed without incurring red cell haemolysis. From one to six pipettes may be shaken at a speed which is variable between 200 and 400 oscillations per minute. A spring fitting allows all standard sizes of pipettes to be accommodated and interchangeable carriers enable Kahn tubes or small bottles to be shaken. The bearings are self-lubricating and the machine is practically silent in operation. For 200/250V 50 Hz a.c. supplies. **With pipette carrier.** Each **£45. 0. 0.** *f*

ACCESSORIES

ME-532	**Kahn tube carrier,** for up to 36 tubes.	Each **£4. 10. 0.**	*f*
ME-534	**Bottle carrier,** for up to 3 small bottles of 100 ml maximum capacity, approximately.	Each **£5. 0. 0.**	*f*

TISSUE GRINDERS

ME-550

TISSUE GRINDERS, (Homogenisers) (AG), for pathological tissue. Comprises glass cup with projecting tube and glass plunger. Cup and plunger are ground internally and externally respectively and there is a very small clearance at the sides and end when fitted together.

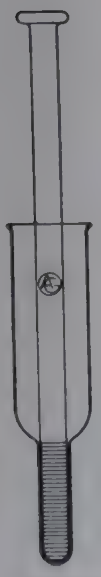
Overall length approx.	180	225 mm	
Ground zone, length approx.	40	50 mm	
Ground zone, diameter approx.	7	11 mm	
Dozen	**290/–**	**430/–**	*oS*
Each	**26/6**	**39/–**	

Q-BC15P with Q-BC15/150

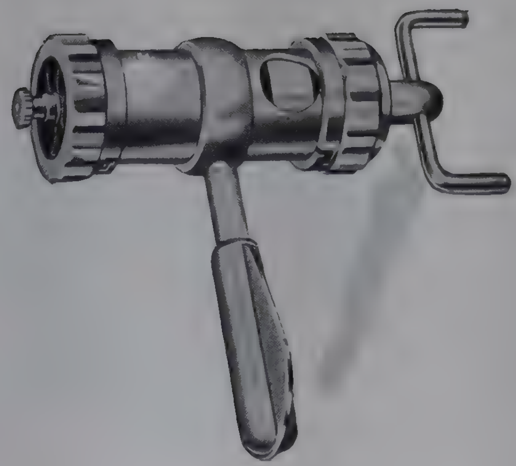
HOMOGENISER, *Quickfit*, see entry under QUICKFIT APPARATUS.

ME-560

TISSUE GRINDER, to take about 50 ml. Comprises a tubular body closed at one end by a perforated plate and a piston. The piston, propelled by a screw, forces the contents through the perforations into the path of revolving knife ... ... Each **£18. 3. 0.** *m*



ME-550



ME-560

Items on this page coded S normally available from stock.

TUBES

TF-104

TUBE, for **Kahn test,** soda-lime glass, with round bottom. Length 75 mm, int. dia. 10 mm, ext. dia. 12 mm. For price see entry in List No. sequence.

TF-123

TUBE, AGGLUTINATION, Dreyer, BS 625 with conical bottom. 60×7 mm. For price see entry in List No. sequence.

ME-630

TUBE, Thunberg, Keilin, , modification with hollow stopper for addition of reagent. Capacity 10 ml.
Each **£0. 18. 0.** a

Thunberg tubes see also **QUICKFIT APPARATUS.**

SAMPLE CONTAINERS

ME-650

CARTON, plastics, with press-on cap. For collecting samples for TB tests. Capacity 150 ml approximately.
Pack of 100 **£1. 3. 6.** c

OTHER SAMPLE CONTAINERS will be found under headings **BOTTLES, CULTURE** and **TUBES** in alphabetical sequence in the catalogue.

URINE TESTING

ME-700

ALBUMINOMETER, Esbach, for estimating the amount of albumen in urine. With bold graduations.
Dozen **£0. 18. 0.** Each **£0. 3. 1.** c

ME-715

UREOMETER, Doremus-Hind, for the estimation of urea in urine by the hypobromite method. From the side tube, which is graduated from 0 to 2 cm³ in 0·1 cm³, urine is transferred to the closed vertical tube where it reacts with a solution of sodium hypobromite. Nitrogen is liberated and measured in the closed tube which is directly calibrated both to 0·03g urea/100 cm³ urine in 0·001g divisions and to 0·5 grains urea/100 cm³ urine in 0·01 gr divisions. Mounted on a glass foot. Each **£2. 2. 0.** c

UREOMETER, Maclean, for the estimation of urea by the hypobromite method. Comprises bottle with mark at 25 cm³, test tube with mark at 5 cm³ and a 50 cm³ gas burette subdivided in 0·1 cm³ fitted with stopcock and side tube.

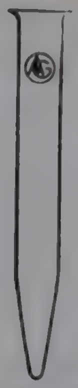
Reference: Practical Clinical Biochemistry by H. Varley. 1963.

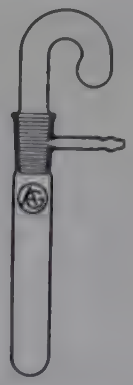
List No.	Component	Dozen	Each	
ME-720	**Bottle**	**28/–**	**3/10**	a
ME-722	**Test tube**	**21/6**	**3/4**	a
ME-724	**Burette**	**205/–**	**18/6**	a
MF-920	**Reservoir**	See entry in List No. sequence.		

ME-740

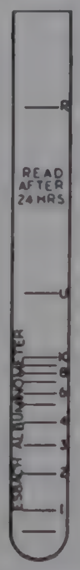
URINE TEST GLASSES, conical shape, with spout.

Capacity	125	200	300 ml	
Dozen	**53/–**	**66/–**	**84/–**	c
Each	**5/8**	**6/8**	**8/–**	

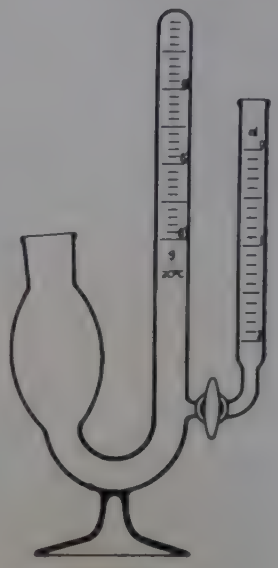

TF-123


ME-630

ME-650



ME-700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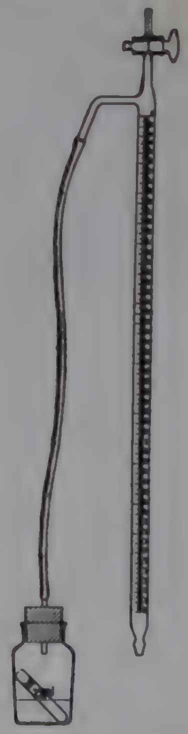
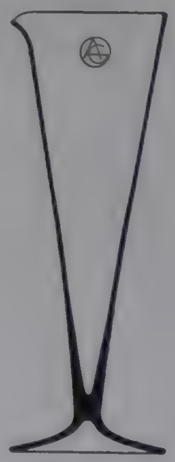

Assembly of ME-720, ME-722, ME-724


ME-740

WASTE DISPOSAL

The following items will be found under List Nos. WD-400 to WD-460 in List No. sequence.

WASTE DISPOSAL SACKS and sackholders

All items on this page normally available from stock.

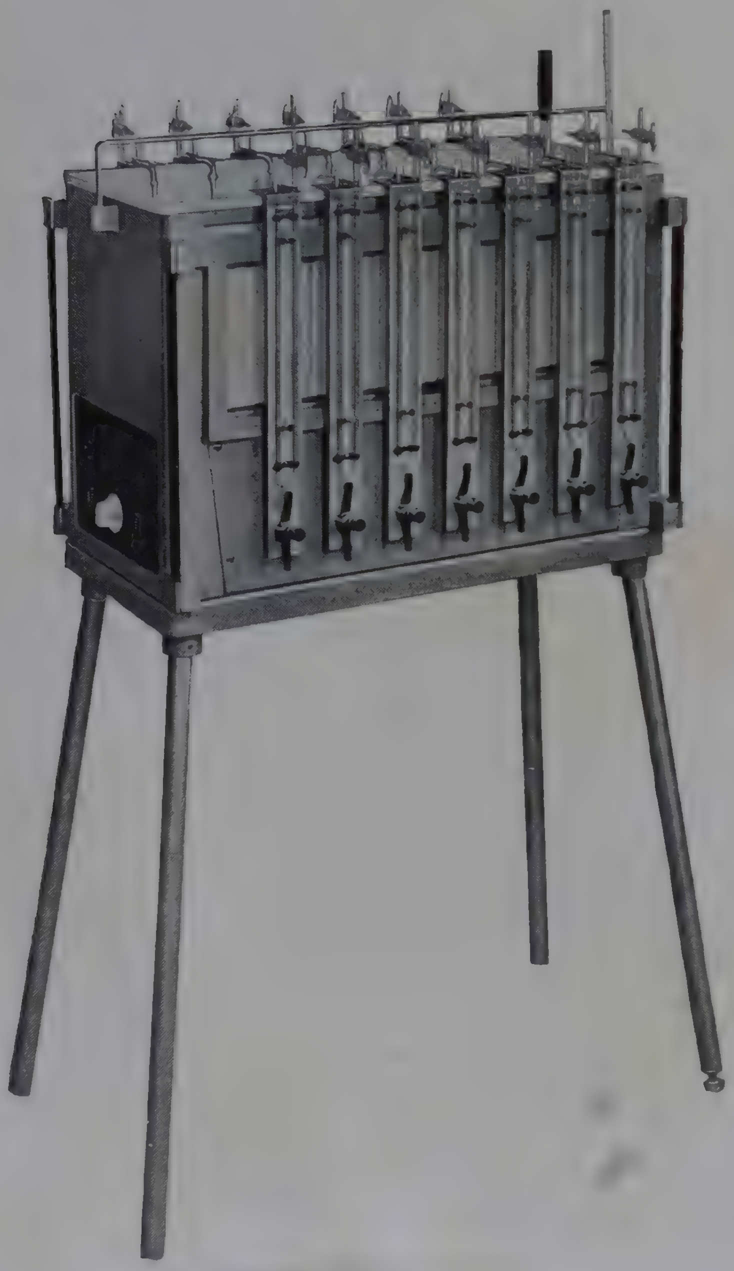
Gallenkamp WARBURG APPARATUS

For the measurement of tissue respiration rates and enzyme activities.

THERMOSTATIC WATER BATH

With precise temperature control and mechanism for mounting and continuously agitating two banks of seven Warburg constant volume respirometers.

- **Contact thermometer provides temperature control between ambient and 50°C to within 0·02°C**
- **Independent motors for each bank of seven respirometers and for stirring rotor**
- **Comprehensive range of (AG) glassware available**



ME-810 with glassware

CONTROLS

The control panel at one end of the bath is fitted with mains ON/OFF switch, 3-heat switch for the two 1200W heaters, separate switches for the three motors and mains and load indicator lights. The shaking speed of either bank of manometers may be set to 100, 120 or 140 oscillations/min by means of the 3-step pulley and driving belt.

DESIGN

The polythene-coated steel bath is on a diecast base and may be mounted on a bench or with the legs fitted, stood on the floor. The manometer holders are fitted with adjustable centre zero scales. A clip is provided for a thermometer.

DIMENSIONS

	H		W		D
Thermostat bath	76	×	29	×	25·5 cm
Overall, without legs	71	×	91	×	41·5 cm
Overall, with legs	135	×	91	×	41·5 cm

ME-810

THERMOSTATIC WATER BATH, Warburg, *Gallenkamp*, as specification, with controls, contact thermometer, 14 manometer holders, clip for measuring thermometer and four legs. **Without glassware.** For single phase supplies.

For 220/240V 50 Hz	Each	**£428. 0. 0.**	*b*
For 200/210V 50 Hz	Each	**£428. 0. 0.**	*bN*
For 110/120V 60 Hz	Each	**£428. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

ME-820	**Manometer mount,** with fixing clamp, centre zero metal scale, adjusting screw and clips for holding manometer. **Without manometer.** Set of 14 **£75. 0. 0.**	Each	**£5.15. 0.**	*b*

For illustration see next page

ME-822	**Immersion heater,** 1200W ...	Each	**£7.10. 0.**	*c*
ME-824	**Motor,** geared	Each	**£16. 0. 0.**	*c*
ME-826	**Driving belt**...	Each	**£0.12. 9.**	*c*
TM-480	**Contact thermometer,** 0–50°C. For price see entry in List No. sequence.			

ACCESSORIES

ME-828	**Manometer stand,** for supporting 7 manometers and mounts when removed from the bath.	Each	**£10.15. 0.**	*b*
TR-300	**Time switch,** with 24 hour dial and adjustable 'on' and 'off' period settings to enable the bath to be automatically switched and raised to operating temperature, thus saving the usual 1½ to 2 hours warm up time. For price see entry in List No. sequence.			

Items on this page normally available from stock except those coded *N*.

(AG) WARBURG GLASS APPARATUS

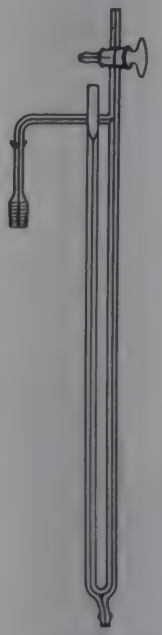
- **Fully interchangeable**
- **Reproducibly made for accurate determinations**
- **Borosilicate glass throughout**
- **Manometers and flasks fitted with hooks for joint retaining springs**

ME-840

MANOMETER, Warburg, with capillary bore. Fitted with 3-way stopcock and 14/15 cone for connecting flask.
Set of 14 **£46. 0. 0.** Each **£3. 12. 0.** *a*

NOTE: The joint for flask connection is fitted with hooks for spring connectors. One pair of spring connectors JR-140, 38 mm is required for each manometer to support either of the flasks listed below.

ME-820


ME-840

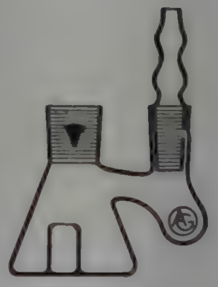
ME-842

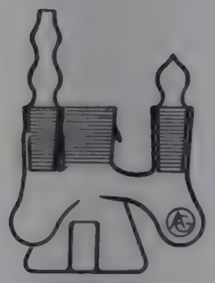
FLASK, Warburg, with side bulb with gas tube. Main neck 14/15 socket.
Set of 14 **£18. 0. 0.** Each **£1. 8. 6.** *a*

ME-844

FLASK, Warburg, as ME-842 but with additional side bulb which is stoppered.
Set of 14 **£25. 0. 0.** Each **£1. 19. 0.** *a*

ME-430	**Pipettes, Warburg,** capacity 0·2, 0·5 and 1 cm³	For prices see entries in List No. sequence.
JR-140	**Springs,** 38 mm	


ME-842


ME-844

BRITISH STANDARDS

The British Standards Institution is the national standardising body of the U.K. The standards which it publishes represent the results of collaboration between a wide range of interests including users, technical and scientific experts and manufacturers.

The BSI maintains close contact with many overseas standardising bodies both by interchange of information and by direct representation through the medium of ISO (International Organisation for Standardisation). Many British Standards, particularly those revised in recent years reflect the influence of international requirements.

Any article made to a British Standard is one on which the purchaser or user can rely as being satisfactory for its intended general use. The BS requirements must be such as will satisfy the majority of users and manufacturers, otherwise the standard will not receive general recognition.

The discerning purchaser will not only require goods made to the appropriate BS but will also recognise that within the framework of a standard a variation of finish and quality is possible and that it is still as important as ever to purchase from a source with a known reputation for high quality.

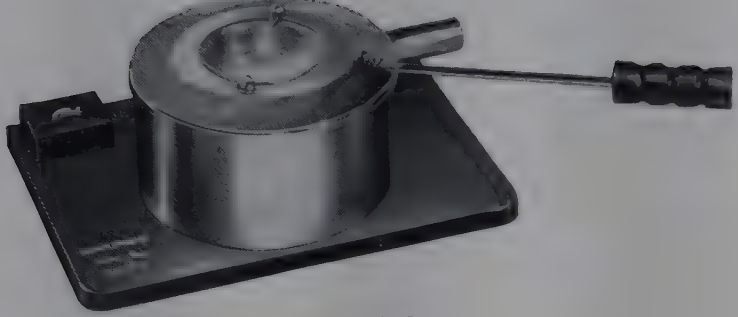
The name *Gallenkamp* has been known in laboratories throughout the world for more than three quarters of a century. *Gallenkamp* products bearing one of the five registered trade marks, *Gallenkamp*, *Technico*, *Compenstat*, (AG) or *Asda* can be relied upon to provide the highest quality at an economic price.

All items on this page normally available from stock.

Gallenkamp MICRO-MELTING POINT APPARATUS

Enables standard microscopes to be used to determine melting points up to 325°C on single crystals

- **For bench and dissecting stage mounting and for clipping on elevated stages**
- **Sample can be illuminated from above or by light from a substage mirror or illuminator**
- **Mains or battery operation**
- **Suitable for melting point of nylon by the BS 2782 (1956) Amendment No. 12 method**



MF-350

OPERATION

The sample is placed on a cover glass within the central recess of the aluminium alloy melting point block. It is covered with a second cover glass and further shielded by a top plate having a central window of Chance HA1 heat absorbing glass which prevents infrared radiation reaching the eye of the operator. For samples liable to sublimation a suitable hole is provided for using a melting point capillary tube.

Sample temperature may be increased at a rate controlled by means of the variable autotransformer accessory or if a battery supply is used, by means of a suitable rheostat. Temperature is measured using a thermometer which is fitted through a tubulure mounted horizontally on the block.

DIMENSIONS

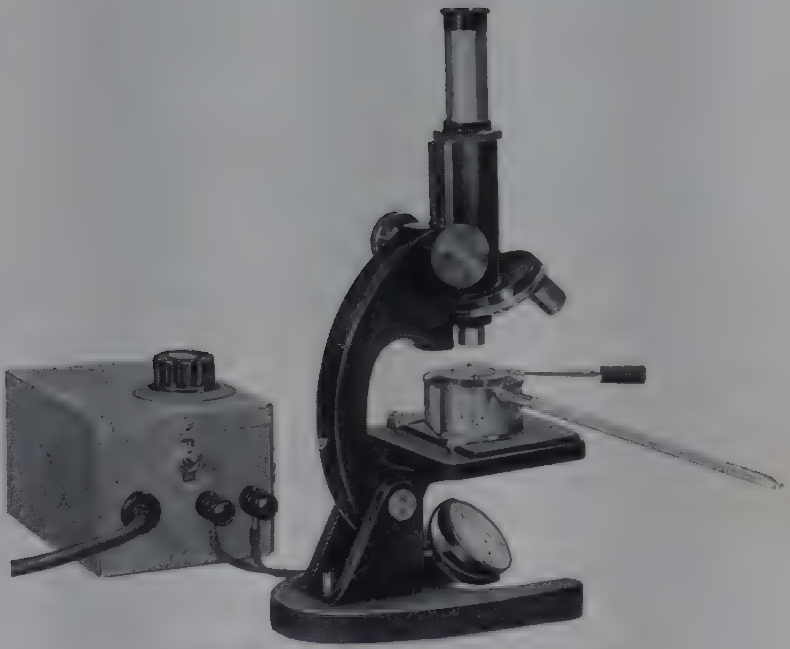
	H	W	D
Overall	4·5 ×	10 ×	8 cm
Power rating, max.	60 VA		

MF-350

MICRO-MELTING POINT APPARATUS, *Gallenkamp*, as specification. Requires but does not include cover glasses or thermometer. For 10V a.c. or d.c. supplies ... ... Each **£16. 15. 0.** *b*

When ordering please state voltage and nature of supply.

Microscopes for use with the above must have a minimum objective lens to stage separation of 45 mm. For suitable microscope see ML-072 in List No. sequence.



MF-350 with MF-352, microscope ML-072 and thermometer

ACCESSORIES

MF-352	**Variable autotransformer,** output 10V at 60 VA. For a.c. single phase supplies.	
	For 200/250V	Each £13. 2. 6. *m*
	For 100/120V	Each £13. 2. 6. *m*
MF-386	**Capillary tubes,** for melting point determinations 100 mm × 1·5–2·0 mm	For prices see entries in List No. sequence.
HJ-762	**Cover glasses,** thickness approximately 0·13 mm, dia. 13 mm and 19 mm	
TJ-340	**Thermometers** with immersion depth 30 mm and various scale spans ...	

All items on this page normally available from stock.

Gallenkamp MELTING POINT APPARATUS

Registered Design No. 889339.

Electrically heated, for determinations of single or mixed melting points up to 350°C.

FEATURES

- **Built-in controls and boost heater**
- **Heats to 200°C in 4·5 minutes, to 300°C in 9 minutes**
- **Three melting point tubes simultaneously observed by means of full field lens**

ILLUMINATION AND VIEWING

The internal lamp, provides uniform and shadowless illumination of the sample tubes, which are viewed through a 2·5 cm dia. lens. The brightness of the background can be adjusted by rotating a knob to the rear of the apparatus.

HEATING

One heater is regulated by a built-in rotary rheostat which permits accurate adjustment of the rate of increase of temperature as the melting point is approached. The other heater, for boosting the heating rate is controlled by a switch. A second switch controls the lamp and the power input to the apparatus.

DESIGN

A cast aluminium case encloses the heating block and controls. The case, 22×13×30 cm high including thermometer support, is finished in grey duotone stoved enamel. **For rapid cooling of the apparatus between tests, the water cooled plug is inserted in place of the thermometer.**

MF-370

MELTING POINT APPARATUS, *Gallenkamp*, electrically heated, as specification. **Without thermometer,** cooling plug or capillary tubes.

For 220/240V a.c. or d.c. supplies. Each **£20. 10. 0.** *b*

For 200/210V a.c. or d.c. supplies. Each **£20. 10. 0.** *bN*

For 110/120V a.c. or d.c. supplies. Each **£20. 10. 0.** *bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

MF-378	**Lamp,** 15W, SBC, pygmy, white.	Each	**£0. 2. 8.**	*m*
MF-380	**Heaters** (two required).	Each	**£0. 6. 4.**	*m*

When ordering replacement parts please state serial number of apparatus and supply voltage.

ACCESSORIES

MF-382	**Cooling plug,** for inserting in thermometer pocket ...	Each	**£1. 12. 0.**	*b*
MF-386	**Capillary tubes,** for melting point determinations, 100 mm×1·5–2·0 mm. Clean, dry and sealed at both ends in packs of 100 tubes.	12 packs Pack	**£5. 10. 0.** **£0. 10. 0.**	*a*
MF-388	**Capillary tubes,** for melting point determinations, 100 mm×1·5–2·0 mm, open both ends in packs of 100 tubes.	12 packs Pack	**£2. 8. 0.** **£0. 5. 4.**	*a*
TJ-340	**Thermometers,** with immersion depth 30 mm and various scale spans. For prices see List No. sequence.			

Gallenkamp
MELTING POINT APPARATUS
MADE IN ENGLAND

MF-370

Items on this page normally available from stock except those coded *N*.

METTLER AUTOMATIC MELTING AND BOILING POINT APPARATUS MODEL FPI

For the rapid, accurate and reliable determination of melting and boiling points and for recording (by means of a suitable recorder) melting ranges between −20 and 300°C.

- **Accurate temperature measurement by platinum resistance thermometer**
- **Results displayed digitally to 0·1°C**
- **Simultaneous determination of melting point on three samples, with individual readout**
- **Boiling points measured on single samples of 50 to 80μl**
- **Heating programme and starting temperature pre-selected by push button**
- **Up to 50 determinations an hour**
- **Rapid, automatic fan cooling at end of test**
- **Fully transistorised circuits**

Mettler FP1
Mettler FP1

MF-430

Performance and operation

Heating rates, °C/minute	0·2; 1, 2 or 3; 10
	Precision
Melting point at 0·2°C/minutes	0·1°C
,, ,, ,, 1, 2 or 3°C/minute	0·5°C
,, ,, ,, 10°C/minute	0·5°C
Boiling point at 0·2°C/minute	0·3°C
Recorder output	100 mV into 5 KΩ minimum

For operation below ambient temperature, down to −20°C the furnace unit must be operated in a top loading laboratory refrigerated cabinet.

Dimensions

Base	Height
Control unit 360 × 385 mm	215 mm
Furnace 162 mm 6·4 in diameter	215 mm 8·5 in

Melting point determination

When the 'Ready' light indicates that the preselected starting temperature has been reached, the operator simply inserts the three melting point tubes or single boiling point tube into the furnace, selects the heating rate and presses the start lever. The instrument carries the determinations to completion with no further attention.

The operator is required to do nothing more than read and record the individual results, each clearly displayed on the readout panel.

***MF-430**

MELTING AND BOILING POINT APPARATUS, automatic, *Mettler* **FPI**, with control unit, furnace unit, melting and boiling point tubes, tube carrier, tube diameter gauge (for other than *Mettler* tubes), standard benzoic acid, spare fuses and bulbs and plastics dust covers. With tapped mains transformer for 110, 125, 145, 160 and 220/240V a.c. supplies. Each **£385. 0. 0.** *mN*

REPLACEMENT PARTS

MF-440	**Melting pont tubes,** packs of 150 tubes.	Pack	**£0. 17. 6.**	*a*
MF-446	**Boiling point tubes,** packs of 40 tubes.	Pack	**£0. 12. 6.**	*a*
MF-448	**Boiling capillaries,** packs of 10.	Pack	**£1. 1. 0.**	*a*

Models modified for three separate recorder outlets are available. Details on request.

Items on this page normally available from stock except those coded *N*.

MF-550

MELTING POINT APPARATUS, *Electrothermal* for the determination of melting points between 20 and 360°C. With block for up to 3 melting point tubes, which are illuminated by two lamps and viewed through a fixed focus lens. With rheostat to control rate of heating and boost heater button. Includes bottle of 'Aquadag' for coating the thermometer bulb, one pack of 100 capillary tubes and thermometer. Overall height without thermometer 41 cm, weight 6 Kg. For 200/250V a.c. supplies ... ... Each **£59. 15. 0.** *m*

MF-555

MELTING POINT APPARATUS, *Electrothermal,* as MF-550 but **without press button booster or fine temperature control** ... ... Each **£49. 10. 0.** *m*

When ordering please state voltage and nature of supply

REPLACEMENT PARTS for MF-550 and MF-555

MF-557	**'Aquadag'** bottle of 78 g	Bottle	**£0. 12. 6.**	*f*
MF-558	**Cylinder,** for block protection ...	Each	**£0. 10. 0.**	*f*
MF-559	**Illuminating lamp**	Each	**£0. 2. 6.**	*m*
MF-560	**Heating element**	Each	**£1. 0. 0.**	*m*
MF-562	**Thermometer,** scale span 20-360°C adjusted for 34 mm immersion	Each	**£3. 15. 0.**	*f*

ACCESSORIES for MF-550 and MF-555

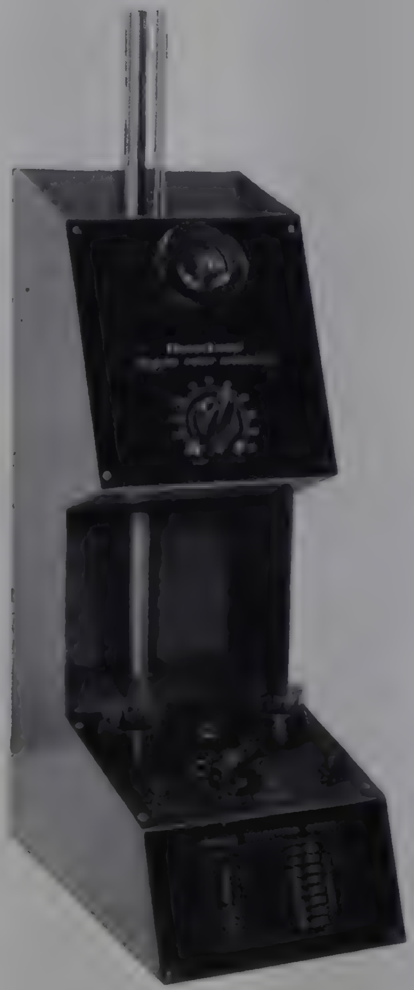
MF-386	**Capillary tubes**	For details and prices see entries in List No. sequence.
MF-388	**Capillary tubes**	

MF-570

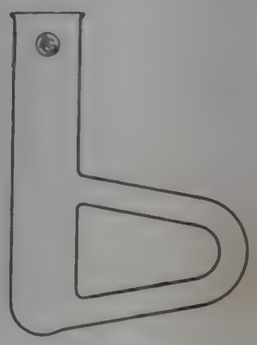
MELTING POINT TUBE, Thiele, Ⓐ borosilicate glass. An inexpensive and accurate apparatus for heating melting point tubes at accurate rates for the determination of melting points. A capillary tube is wired to a suitable melting point thermometer so that the sample it contains is held close to the thermometer bulb. By means of a drilled cork the thermometer and capillary are mounted in the Thiele tube which is filled to just above the side limb with a non volatile fluid. On heating the bend of the side limb, heated liquid circulates and raises the temperature of the sample in such a way that stirring is unnecessary. Dozen **£5. 10. 0.** Each **£0. 10. 0.** *a*

ACCESSORIES

MF-388	**Capillary tubes,** for melting point determinations, 100 mm × 1·5–2·0 mm, open both ends	For prices see entries in List No. sequence.
TJ-340	**Thermometers** with immersion depth 30 mm and various scale spans.	



MF-550



MF-570

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories. Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for standard packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'dozen' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about 50/0d. per dozen.

This system is intended to encourage ordering in standard packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

All items on this page normally available from stock.

Gallenkamp MERCURY STILLS

- Continuous operation—mains powered
- Optional manual or auto feed
- Output 2·5 kg/hr

MF-850

MF-855

Construction

The distillation vessel is a borosilicate glass bulb with wide-bore capillary feed and outlet tubes. A water cooled cold-finger condenser is sealed into the top of the bulb, which rests on an electric heater in an asbestolite insulating box. The whole assembly, including a mercury feed system and siphon outlet, is mounted on a wood stand with a large mercury tray base. A rheostat is used to adjust the heat input.

Operation

The distillation bulb is evacuated and sealed, mercury being drawn in through the feed tube and up the outlet tube to barometric height. When heat is applied, the mercury in the bulb boils *in vacuo*, condenses and flows down the outlet tube. Raw mercury from the reservoir flows into the feed tube, the level being maintained by adjusting the height of the levelling bulb. The distillate falling into the outlet tube acts as a Sprengel pump, and if the mercury is reasonably clean, thereby maintains a hard vacuum. Distilled mercury siphons out of the trap into a stock bottle.

Automatic feed device

This comprises a stainless steel reservoir which is suspended from a spring so designed that if mercury is added or taken away, the level of mercury remains constant relative to the stand. The feed tube leads from the reservoir to the distillation bulb in which the mercury level remains constant whatever the demand. It is only necessary to replenish the reservoir occasionally and to remove the distillate. The still will produce about 10 kg, without replenishment. The reservoir can be replenished without interrupting the distillation process. A safety switch is incorporated which turns off the heater when the mercury level falls below a certain point.

Dimensions	Overall height	145 cm.
	Base	31 × 36 cm.

MF-850

MERCURY STILL, *Gallenkamp*, electrically heated, as specification, for a.c. or d.c. supplies. With rheostat and instructions for use.

For 200/250V	Each	**£57**. 0. 0.	*b*
For 110/120V	Each	**£58**. 0. 0.	*bN*

MF-855

MERCURY STILL, AUTOMATIC, *Gallenkamp*, as MF-850, **but with automatic feed device.** For a.c. supplies only.

For 200/250V	Each	**£76**. 0. 0.	*b*
For 110/120V	Each	**£77**. 0. 0.	*bN*

REPLACEMENT PARTS for MF-850 and MF-855

MF-860	**Heating element**	Each	£4. 4. 0.	*b*
	When ordering, please state voltage and nature of supply.			
MF-862	**Main glass part only,** borosilicate glass.	Each	£5. 0. 0.	*a*
MF-864	**Mercury reservoir,** glass, for MF-850 only.	Each	£0. 19. 0.	*a*
MF-866	**Levelling bulb,** glass, for MF-850 only.	Each	£0. 12. 0.	*a*
MF-868	**Siphon tube,** glass	Each	£0. 12. 0.	*a*

A vacuum pump giving about 1 torr pressure is necessary for starting and sometimes for running mercury stills. For suitable pump see Vacuum Pumps.

Items on this page normally available from stock except those coded *N*.

MF-880

MERCURY PURIFICATION APPARATUS, Ostwald. Mercury is cleaned by allowing it to fall in the form of small globules down a column of dilute nitric acid. The very small mercury drops are formed by passage through a fritted glass plate situated in the mercury reservoir at the top of the glass column. The apparatus is mounted on a hardwood stand with large mercury tray base ... ... Each **£8. 10. 0.** *a*

MF-885 **Main glass tube only,** for MF-880. Each **£1. 13. 0.** *a*

MF-890 **Fritted glass distributor tube,** with fritted plate 30 mm dia. Ref. No. 175X0 ... Each **£1. 1. 6.** *a*

FRITTED FILTER TUBES for purification of mercury see FD-560 in List No. sequence.

MF-910

MERCURY RESERVOIR, cylindrical, 40 ml.
Dozen **£4. 16. 0.** Each **£0. 9. 0.** *a*

MF-920

MERCURY RESERVOIRS, heavy glass.

Capacity	150	250 ml	
Dozen	**58/–**	**63/6**	*m*
Each	**6/2**	**6/6**	

MF-930

MERCURY, virgin, in polythene bottle containing 3 kg.
Each **£31. 0. 0.** *m*

MF-932

MERCURY, triple distilled within A.R. Specification, in stoneware bottles.

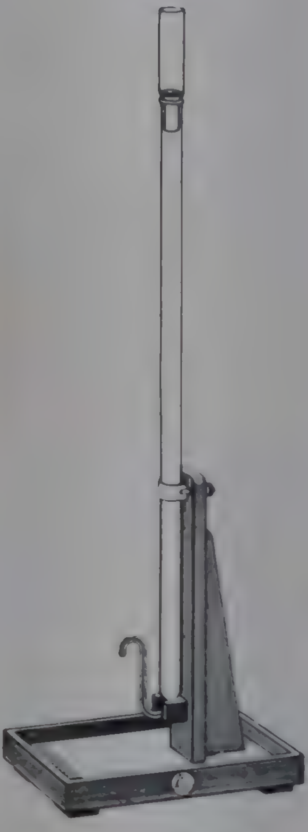
Weight	500g	1	3 kg	
Each	**145/–**	**270/–**	**780/–**	*c*

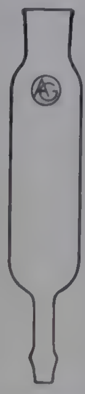
MF-935

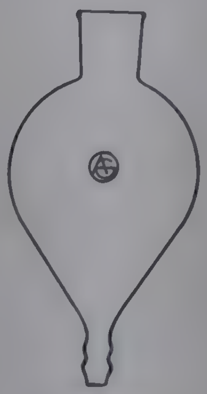
MERCURY COLLECTOR, for picking up spilt mercury, thus reducing this dangerous laboratory hazard. It consists of a plastics foam pad in a screw top polythene container. In use, the top with the pad attached is pressed firmly against the surface where mercury has been spilt. Mercury globules enter the cells in the pad and are expelled into the container when the lid is replaced. The lid contains a spare foam pad.
Each **£1. 1. 0.** *m*

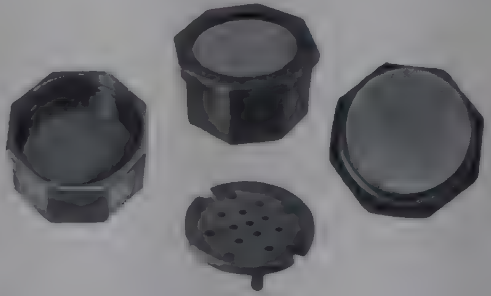
MF-937 **Plastics foam pad,** spare for MF-935.
Pack of 6 **£0. 4. 0.** *m*

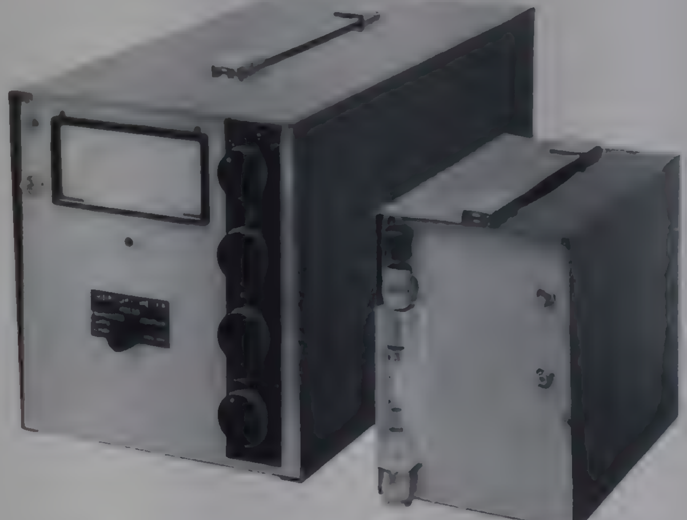
Mercury tray see **TRAYS.**


MF-880


MF-910


MF-920


MF-935


MF-950 MF-952

MERCURY VAPOUR METER

Designed to meet the requirements of health authorities, this compact instrument provides for the frequent intermittent monitoring of atmospheric mercury vapour.

Stability and freedom from errors are guaranteed by employing a two channel system. Air which may be contaminated with mercury vapour is compared in two absorption chambers with air filtered free from mercury. The chambers are irradiated with uv at 254 nm from a cold cathode discharge lamp and any out-of-balance is detected photoelectrically and displayed on a microammeter directly calibrated in concentration of mercury.

Air may be aspirated through this instrument with any small vacuum or water-jet pump having a capacity of 600 l/hr but the matching, purpose-built auxiliary aspirator pump is recommended.

Sensitivity	0–100 and 0–600 μg mercury/m^3 air.
Power supply:	200/250V 50 Hz single phase.

MF-950

MERCURY VAPOUR METER, *Engelhard-Hanovia,* as specification, **without aspirator pump.**
Each **£390. 0. 0.** *fN*

ACESSORY

MF-952 **Aspirator pump** with built-in flowmeter and needle control valve ... ... Each **£63. 0. 0.** *fN*

Items on this page normally available from stock except those coded *N.*

METALLURGY
SECTION INDEX

Item	Page	Item	Page
Carbon in iron and steel analyser	491	Mounting press	487
Corrosion cabinets	493	Polishing materials	489/490
Engraving tool	490	Specimen cabinet	490
Gasometric apparatus	491	Specimen grinders	488
Mounting kit	487	Specimen polishers	489
Mounting medium	487	Thickness gauges...	492

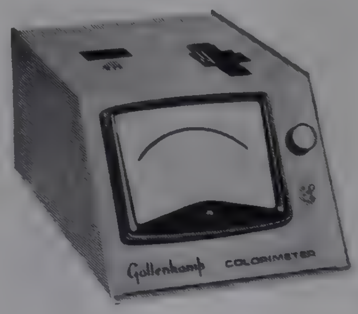
Other equipment used in Metallurgical Analysis will be found under the following section headings:

Boats
Crucibles
Colorimeters
Electrochemical analysis
Furnaces

Gas analysers
Mills
Sample dividers
Sieves
Spectrophotometers

Gallenkamp SPECIALITIES FOR METALLURGICAL ANALYSIS

COLORIMETER



- Transistorised stabiliser circuit.
- Rapid response—stable readings.
- Wide range of filters available.

For full details see CS-200 in List No. sequence.

CS-200

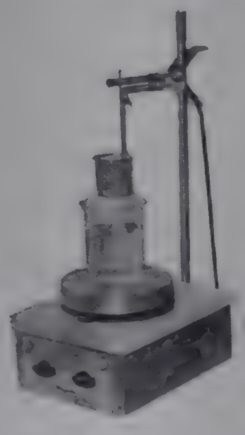
FLAME ANALYSER

- 5 ppm K and 2 ppm Na full scale
- Insignificant cross-interference.
- Immediate operation, negligible drift.

For full details see FH-500 in List No. sequence.

FH-500

ELECTRODEPOSITION ANALYSER



- Hotplate and magnetic stirring.
- Stationary electrodes.
- Single or 3-test unit.

For full details see EJ-090 et seq. in List No. sequence.

EJ-090

TUBE FURNACE

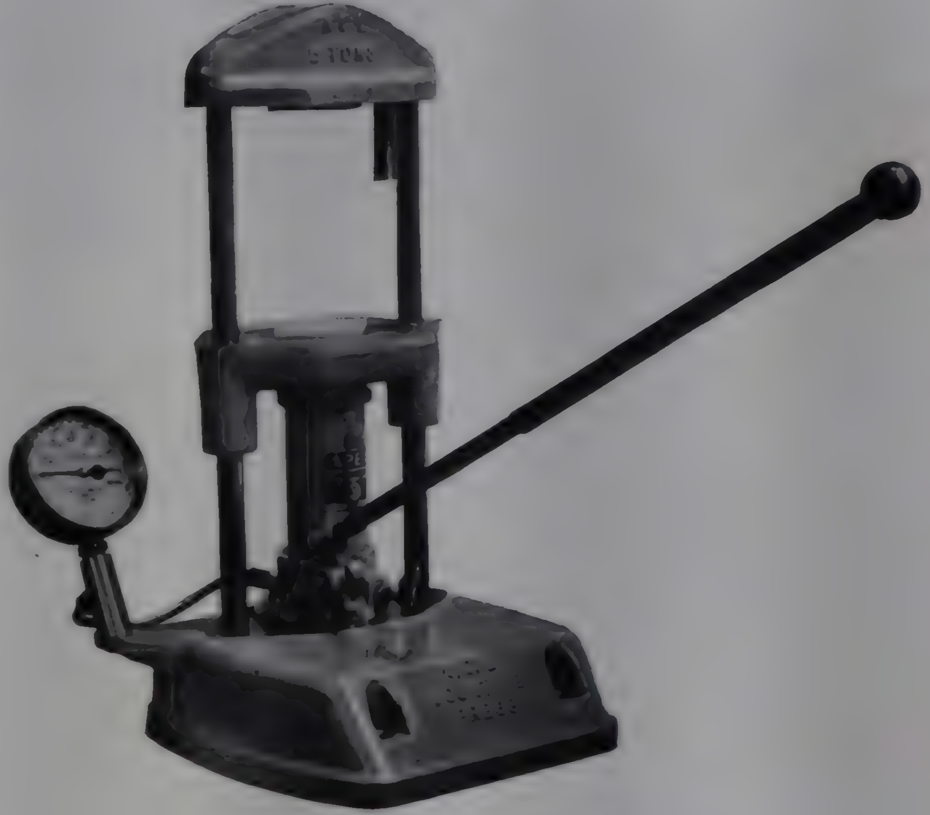
- Maximum temperature 1400°C.
- Rapid heating—1 hour to 1400°C.
- Manual or auto-control of temperature.

For full details see FS-300 and FS-302 in List No. sequence.

FS-300

METALLURGICAL MOUNTING PRESS

For mounting metallurgical specimens in plastics for examination. Using this press, routine mounting can be achieved simply and rapidly—about four minutes per mount. Absolute adhesion of the mounting medium to the metal enables the extreme edges of such parts to be studied. This press can be used for the examination of ball-bearings, wires, plated sheets, etc., and the use of mounting medium avoids the differential etching that occurs very frequently when fusible alloys are used for the mounting. The press is equipped with a positive ejector for easy removal of the mount from the mould.


MH-510

MH-510

MOUNTING PRESS, for 5 ton load, a self-contained bench type hydraulic press with rising bottom platen, fitted with hydraulic gauge reading 0 to 11,000 lb total thrust. With insulating plates, hand pump and oil storage facilities for the ram and provided with a thermometer tubulure ... ... Each **£96. 0. 0.** *f*

MH-515

MOUNTING PRESS, for 10 ton load, as MH-510 but with four column guides ... Each **£170. 0. 0.** *fN*

ACCESSORIES suitable for pressures up to 2 $t/in.^2$

Prices on application for higher pressures.

MH-520	**Mould outfit,** comprising a steel cylinder, base and plunger drilled for thermometer.			
	For mounts	1	1½ in dia.	
	Each	£13. 10. 0.	£13. 10. 0.	*f*
MH-522	**Mould heaters,** concentric type, with flex and adapter plug.			
	For moulds	1	1½ in	
	Each	£18 15. 0.	£18. 15. 0.	*f*
MH-524	**Mould coolers,** concentric type, with water jacket,			
	For moulds	1	1½ in	
	Each	£8 0. 0	£9. 0. 0.	*f*
MH-530	**Mould heaters, split type,** with cast aluminium head, cartridge elements, plated tongs and ebonite handles.			
	For moulds	1	1½ in	
	Each	£34. 0. 0.	£38. 0. 0	*f*
MH-532	**Mould coolers, split type,** with cast aluminium head, plated tongs and ebonite handles.			
	For mounts	1	1½ in	
	Each	£19. 10. 0.	£20 0. 0	*fN*
	Heat controllers, for accurate temperature control of above mould heaters, see EC-810 et seq. in List No. sequence.			
TJ-050	**Thermometer,** mercury-in-glass, scale span 0–200°C. See entry in List No. sequence.			

MH-537

MOUNTING MEDIUM, thermosetting black bakelite, in pack containing 1 kg which is sufficient for about 70 mounts ... ... 5 packs **£3. 6. 0.** c
Pack **£0. 14. 0.**

MH-522 MH-520 MH-524

MH-539

MOUNTING MEDIUM, thermoplastic acrylic transparent crystals. In pack containing 1 kg which is sufficient for about 70 mounts ... 5 packs **£7. 0. 0.** c
Pack **£1. 10. 0.**

MH-550

PLASTICS MOUNTING KIT, a cold setting acrylic resin for cold or hot mounting of metallographic specimens with or without pressure. The complete kit, comprising 1 lb powder, ½ lb liquid and 2 oz of acid hardener which is only used for increasing hardness if mount does not require stamping, is sufficient for mounting about 100 specimens ... Each **£1. 18. 0.** m

Full details of method on application.

Items on this page normally available from stock except those coded *N.*

SPECIMEN GRINDERS

MH-600

MH-600

HAND GRINDER, for rough finishing of metallographic specimens on grinding papers or cloths of dimensions 9 × 13¾ in. Comprises frame with an elevated polished black glass platform on which the grinding paper is securely held by a clamping bar.
Each **£12. 10. 0.** *fS*

MH-625

MH-625

GRINDING MACHINE, bench mounting. The two 13 cm dia. grinding wheels, one coarse and one fine, are fitted to either end of the grinder and are protected by full sized heavy duty guards. The wheels are driven by a 210W geared motor fitted with ball bearings which are lubricated for life. An adjustable rigid tool rest is fitted in front of each wheel and a wide water tray for quenching stands at the front of the grinder. For 230/250V a.c. single phase supplies ... Each **£13. 19. 6.** *f*

MH-630

BELT SURFACER, for dry surfacing of specimens. Comprises endless belt on two pulleys, one driven by an electric motor fitted in the base. With case fitted with handles and 5¾ × 4 in surfacing aperture. For 230/250V 50 Hz single phase supplies ... Each **£125. 0. 0.** *f*

MH-630

A low cost microscope for stereoscopic examination of small metallurgical samples.

- Robust construction.
- Rotating turret with parfocal objectives.
- Distortion-free optics—vivid imagery.

Olympus **Low Power Stereoscopic Microscope Model VT-11**

See ML-340 in List No. sequence.

Items on this page coded S normally available from stock.

POLISHING MACHINE

MH-705

POLISHING MACHINE, with 8 in dia. disk to take polishing cloths or abrasive paper. With fractional hp 1420 rev/min motor, giving disk speeds of 500, 750 and 1000 rev/min, mounted on a heavy metal box together with a splash guard and drip-feed reservoir. The rate of feed at the height and position of the reservoir can be varied as required. For 220/240V a.c. single phase supplies ... ... Each **£93.10. 0.** *f*

ACCESSORY

MH-710 **Abrasive disks.** Pack containing:

6 each waterproof paper disks grades 80, 100, 120, 150, 180, 240, 320, 400, 500, 600.

6 each cloth backed disks grades 80, 100, No. 1, No. 2.

1 selvyt cloth ... ... Pack £6. 7. 6. *f*

MH-705

AUTOMATIC POLISHING MACHINE

A sturdy and compact machine with mechanically operated specimen holders for polishing a wide variety of specimens. It may be controlled remotely for radioactive work. It is readily adaptable for grinding, polishing or etch polishing, the polishing wheels and a plastics etch polishing bowl being easily interchanged.

Specimens are held by a swinging parallel linkage driven by the motor. For grinding, a cup specimen holder is used, this remaining flat on the grinding wheel. A ball-ended spigot is used to hold specimens against the polishing wheel. Lubricant is supplied from a tank; precise control is effected by a needle valve. Speed control may be obtained using a variable transformer.

Dimensions 21 × 25·5 × 40 cm (8½ × 10 × 16 in).

Weight 6 kg (13½ lb).

MH-725

AUTOMATIC POLISHING MACHINE, as specification, with 6 in dia. disk, ball-ended and cup-ended specimen holders, one cup plate and etching bowl, for 200/250V a.c. supplies ... ... Each **£168.10. 0.** *f*

ACCESSORY

ED-602 **Variable transformer,** for speed control. For details and price see entry in List No. sequence.

MH-725

POLISHING MATERIALS

MH-740

ALUMINA POWDER, dry state, for rapid scratch free polishing of metallurgical specimens. In bottle containing 25 g.

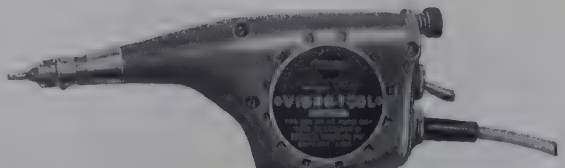
Grade	2/20	1/30	Gamma	
Particle size, average	2	1	under 1 μm	
5 bottles	**70/–**	**116/–**	**135/–**	*mS*
Bottle	**15/–**	**24/6**	**28/6**	

MH-742

CARBORUNDUM POWDER, for coarse polishing of metallurgical specimens.

Mesh size	400	600	700	
Per lb	**10/6**	**14/–**	**16/–**	*cS*

Items on this page coded *S* **normally available from stock.**



MH-780

MARCON
DIAMOND
abrasive compound for fine lapping & polishing
1
micron
MARCON

MH-745

MH-790

POLISHING MATERIALS

(continued)

MH-745

DIAMOND ABRASIVE AEROSOL, *Marcon.* An aerosol dispenser, designed specifically for the metallurgical laboratory, which applies Marcon diamond polishing compound through a special valve to result in an accurately dispersed application of diamond over the whole face of the work piece. The chemical base, which has strong adherent properties to prevent loss of compound during polishing, also prevents sedimentation or agglomeration of the diamond particles. The suspension is water soluble with built-in lubricant and cleaning solution. It is coloured (but non-staining) to provide an indication of the thickness of the layer on the work surface and the micron grade being used. In spray can containing approximately 110 ml (4 fl. oz).

Mean particle size (µm)	Colour code	Purpose	Each	
¼	Pink	Fine finishing	**£3. 15. 0.**	*m*
1	Blue	Routine investigation	**£3. 0. 0.**	*m*
3	Green	Medium finishing	**£5. 15. 0.**	*m*
6	Yellow	Pre-polish	**£5. 15. 0.**	*m*
10	Red	Scratch removal	**£6. 10. 0.**	*m*

MH-780

SPECIMEN ENGRAVER, a portable, solenoid-operated vibro tool for engraving metallurgical specimens. For 230/250V 50 Hz single phase supplies. Complete with hard point engraving head ... ... Each **£4. 15. 0.** *m*

REPLACEMENT PARTS AND ACCESSORIES

MH-783	**Hard point**	Each	**£0. 4. 0.**	*m*
MH-784	**Extra hard point**	Each	**£0. 5. 0.**	*m*
MH-785	**Diamond point**	Each	**£2. 5. 0.**	*m*

MH-790

SPECIMEN CABINET, with seven sealed drawers each with canister of indicating desiccant and lined to protect the surfaces of specimens. Each drawer is 5 cm deep and will accommodate one specimen rack MH-791 or MH-792. Overall dimensions 70 × 56 × 51 cm, nett weight 80 kg.
Without racks ... ... Each **£65. 10. 0.** *f*

The cabinet is supplied in a crate charged at £5. 0. 0. which is refunded on return in good condition.

ACCESSORIES

MH-791	**Rack, to accommodate 86 × 1¼ in specimens.**	Each	**£4. 0. 0.**	*f*
MH-792	**Rack, to accommodate 96 × 1 in specimens.**	Each	**£4. 0. 0.**	*f*

Gallenkamp

FR-572

Gallenkamp MUFFLE FURNACES, 1000/1100°C

A range of muffle furnaces in three sizes with three alternative forms of control suitable for metallurgy laboratory, and tool room use.

- Heating to 1000°C in 1¼ hours.
- ±1°C control with proportional controller.
- Draught control chimneys fitted at rear.

Details see FR-550 et seq. in List No. sequence.

All items on this page normally available from stock.

CARBON DETERMINATION APPARATUS

Developed in conjunction with the Steel Company of Wales Limited

Originally designed for the iron and steel industries, the Titracarb may be used for almost any application where carbon can be determined by burning the specimen in oxygen to produce carbon dioxide. Such applications include determination of carbon in non-ferrous metals, minerals such as limestone and soils, field crops, respiratory air, coal and oil.

Technical Data

Range:	<0·001% to at least 3% carbon.
Analysis time:	2–3 minutes.
Reproducibility:	c. 10% for samples with 0·001% carbon. c. 1% for samples with 0·1% or more carbon.

OPERATION AND CONSTRUCTION

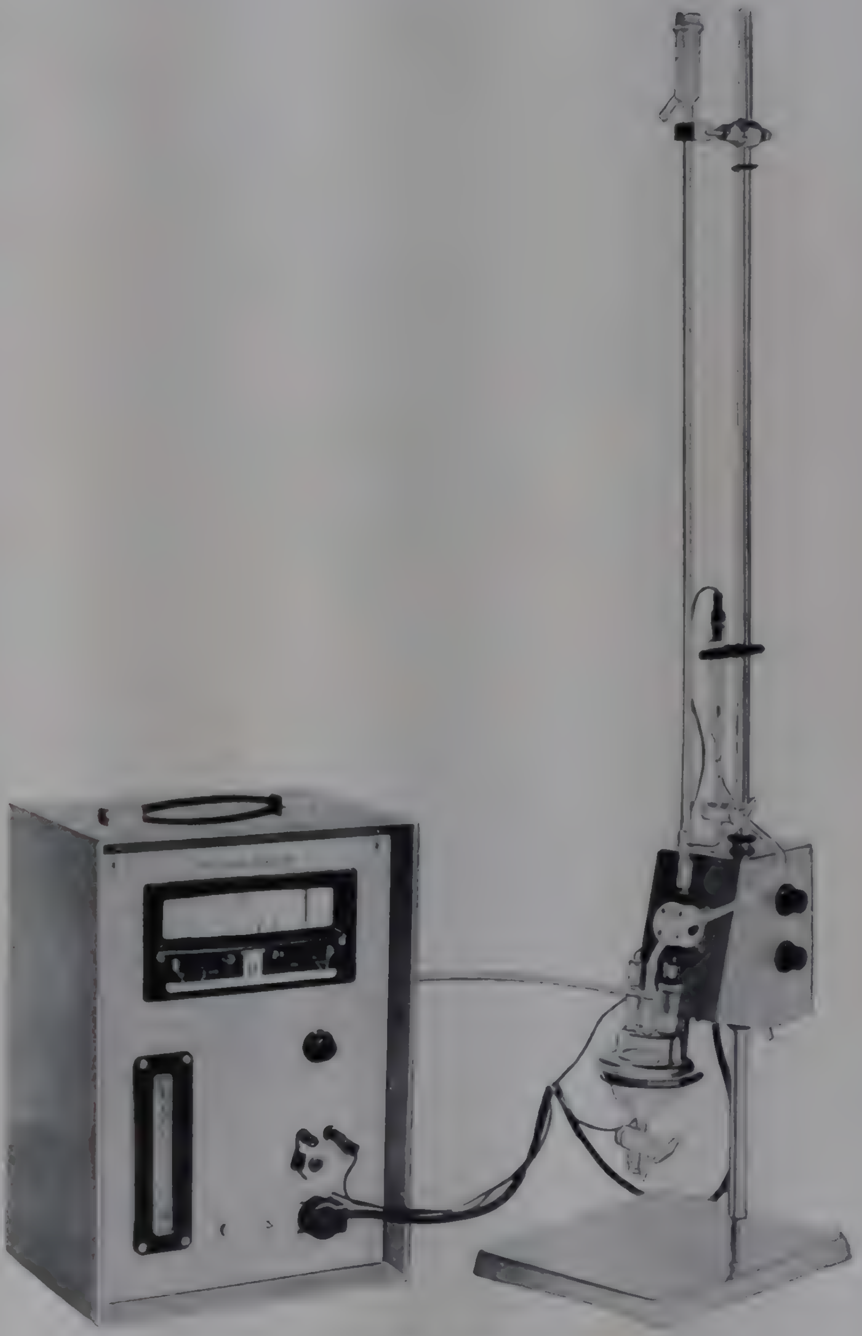
The *Titracarb* is basically a titration control unit. The iron or steel sample having been burned in oxygen, in a suitable furnace at about 1200°C, the carbon dioxide formed from the carbon is absorbed in formdimethylamide and is then automatically titrated with tetra-n-butyl ammonium hydroxide.

The titration is effected by a burette fitted with a solenoid operated diaphragm tap which has both fast, fully open flow rate and a pulse-controlled slow rate adjustable from one thousandth to one tenth of the fast rate. The two rates are necessary because of the widely different rates at which carbon dioxide may be evolved and the need to keep titration time to a minimum without sacrificing accuracy. The change from fast to slow rate and the stopping of the flow when the end point has been reached are governed by preset electronic control switches which can be adjusted to give the optimum titration time for a given type of sample.

The control unit incorporates a d.c. millivoltmeter which, in conjunction with the electrodes, detects the end point.

The *Titracarb* also contains a pump to draw oxygen through the apparatus, a flow meter and regulator valve and a power supply for the diaphragm valve and pulse generator.

Additional apparatus normally required includes a cylinder supply of oxygen, a suitable furnace and combustion boats. The absorption and titration reagents are obtainable from British Drug Houses Ltd.



MH-800

MH-800

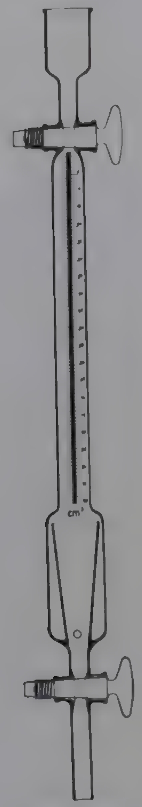
CARBON DETERMINATION APPARATUS, *EIL Titracarb,* as specification, including controller with millivoltmeter, vacuum pump, regulator valve and power supply, titrator with solenoid valve and variable pulsing unit, and CO_2 absorption cell. **Requires but does not include furnace, combustion boats, oxygen supply and chemicals** ... ... Each **£390. 0. 0.** *f*

When ordering please state voltage and nature of supply.

ACCESSORIES

BR-681 et seq.	**Combustion boats**	For details and prices see entries in List No. sequence.
FS-300	**Tube furnace, 1400°C**	
FS-302	**Tube furnace with auto control, 1400°C**	
FS-350	**Twin tube furnace, 1400°C** ..	
FS-400	**Tube furnace, with auto control, 1500°C**	
GD-405	**Oxygen, cylinder**	
GD-500 et seq.	**Oxygen cylinder fittings** ...	

MEASUREMENT OF THICKNESS OF SURFACE COATING



MH-825

MH-830

MH-825

GASOMETRIC APPARATUS, to BS 443, for determination of the thickness of galvanized coatings on wire. Comprises 100 cm³ burette subdivided in 0·5 cm³ with bulb, two stopcocks and a tubulure for connection to a levelling bulb. **Main glass part only.**

Each **£7. 10. 0.** *a*

ACCESSORY

MF-920 Mercury reservoir levelling bulb, capacity 150 ml. For price see entry in List No. sequence.

MH-830

THICKNESS GAUGE, *Elcometer*, a hand-operated instrument for direct thickness measurements of any non-magnetic coating on a ferrous base. Comprises a strong, permanent magnet with an air gap in which an armature, attached to the pointer, is situated. The proximity of a ferrous surface to the two contact spheres directly affects the flux passing through the air gap and thus the pointer deflection. Readings are accurate to ±5%. With double scale calibrated 0 to 20 thousandths of an inch and 0 to 0·5 mm ... Each **£15. 15. 0.** *fN*

Note: Details of the many other ranges available on application.

MH-840

MH-840

THICKNESS GAUGE, *Minitor*, for checking the thickness of non-conductive coatings on non-ferrous bases and other similar applications. Especially useful for spot-checks on paint, varnish, enamel, plastics and rubber coatings. The instrument is fully transistorised and weighs only 400 g. Simple controls comprise on/off switch, zero set and sensitivity knobs. Scale calibrated 0-20 thousandths of an inch subdivided in 0·001 in. In hide leather carrying case with calibration foils and *Mallory* TM146 8V battery ... ... Each **£65. 0. 0.** *fN*

The above instrument is also available to order with scale 0-5, 0-10 thousandths inch or 0-250, 0-500 microns.

Items on this page normally available from stock except those coded *N*.

CORROSION RESISTANCE OF SURFACE COATING

MH-860

SALT SPRAY CABINET, to BS 1224, ASTM B117/64 and ASTM B287/62, for testing the resistance to corrosion by salt spray or acetic acid salt spray of electroplated materials. Comprises a plastics cabinet, 75 × 50 × 50 cm, jacketted on three sides, an integral 40 litres brine chamber and a domed plastics cover, all mounted on a rigid metal frame. The water in the jacket is heated by two 900 W immersion elements and thermostatically held at 95°F. A humidifier tower is built into one side and a pair of nozzles set at right angles cause the formation of a fine mist. A diaphragm type compressor is driven by a $\frac{1}{3}$ hp motor for 230/250V 50 Hz single phase supplies. With diaphragm type pressure gauge calibrated 0–40 lb/in^2. Overall dimensions 135 × 105 × 71 cm.

Each **£360. 0. 0.** *f*

When ordering please state voltage and nature of supply.

MH-860

Salt spray tank see PB-230 in List No. sequence.

MH-870

ACCELERATED CORROSION TEST CABINET, for the copper accelerated salt spray (CASS) test described in BS 1224 and ASTM B368, also for the acetic acid and salt spray tests detailed under List No. MH-860. Comprises transparent plastics spray cabinet with lid, integral brine chamber, external humidifier and air compressor all mounted on metal frame. A water jacket on three sides is heated by two 900W elements thermostatically controlled at 135°F and with mercury thermometer range 80 to 160°F to indicate temperature. The humidifier is operated by a 1000W heater. The air compressor for atomising the spray has a $\frac{1}{4}$ hp motor and pressure gauge. Overall dimensions 103 × 102 × 140 cm high. Internal dimensions 75 × 50 × 50 cm high. For 230/250V 50 Hz a.c. supplies ... ... Each **£440. 0. 0.** *f*

When ordering please state voltage and nature of supply.

MH-870

METEOROLOGICAL APPARATUS

Apparatus for meteorological purposes will be found in this catalogue as list below.

BE-350 to BE-430	**Barometers,** mercury.	**HV-400 to HV-450**	**Hygrometers,** paper and hair.
BE-450	**Barometer,** aneroid.	**RB-800 to RB-840**	**Rain gauges.**
BE-500 to BE-520	**Barographs.**	**SH-080 to SH-090**	**Soil moisture tensiometers.**
HV-010 to HV-080	**Hygrometers,** dew point.	**SH-210**	**Thermometers,** soil.
HV-100 to HV-121	**Hygrometers,** Mason.	**TJ-920 to TJ-940**	**Thermometers,** maximum and minimum.
HV-200 and HV-201	**Hygrometers,** whirling.	**TJ-930 to TJ-965**	**Thermometers,** wall.
HV-240	**Hygrometer,** Assman.	**TK-100 to TK-105**	**Thermographs.**
HV-252 to HV-260	**Humidity** tables and calculator.	**TK-150 to TK-155**	**Thermohygrographs.**

MICROCHEMICAL APPARATUS

Other apparatus suitable for microchemical purposes will be found under the following List Nos. in this catalogue.

AB-860 and AB-865	**Absorption tubes,** Pregl.
AB-920	**Absorption tube,** Flaschenträger.
BA-500 to BA-564	**Balances,** micro and semi-micro, *Mettler.*
BD-520 and BD-550	**Balance weights,** micro.
BR-730 and BR-740	**Boats,** micro-combustion.
BW-634 to BW-786	**Burettes,** micro.
BX-085 and BX-285	**Burners,** micro.
CF-200 to CF-205	**Centrifuge,** semi-micro.
CJ-005	**Centrifuge tubes,** micro.
CK-120 to CM-240	**Chromatography** apparatus.
CS-200 to CS-280	**Colorimeter,** *Gallenkamp.*
DK-710	**Desiccator,** pistol pattern.
DK-725	**Drying apparatus,** *Gallenkamp.*
DT-750	**Distillation set,** semi-micro.
DT-865 and DT-870	**Laboratories,** *Quickfit* semi-micro.
EJ-930	**Microtitration** apparatus, *Gallenkamp.*
EV-810 with EV-900	**Countercurrent extraction.**
FD-620 to FD-670	**Fritted filters,** Pregl and others.
FH-500	**Flame analyser,** *Gallenkamp.*
FJ-170 to FJ-200	**Flasks,** semi-micro.
HD-570 and HD-575	**Heating mantles,** *Electrothermal.*
HR-100	**Microhydrogenation** apparatus, *Gallenkamp.*
MD-010	**Micro haematocrit** centrifuge.
MD-120 to MD-150	**Microdiffusion** dishes and shaker.
MF-350	**Micro-melting point** apparatus, *Gallenkamp.*
MW-140 and MW-145	**Ebulliometer,** semi-micro, Heitler.
NR-410 to NR-690	**Nitrogen determination,** Kjeldahl.
PM-486 and PM-566	**Pipettes,** micro.
PR-355 and PR-365	**Plates** for spot analysis.
SJ-214 and SJ-216	**Spatulas,** Chattaway micro.

MK-050

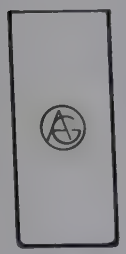
BEAKERS, micro, tall pattern, to BS 1428 Pt. E2, borosilicate glass, for filter sticks, etc.

Capacity	7	20 ml	
Height	35	55 mm	
Ext. dia.	18	24 mm	
Dozen	25/–	39/–	*a*
Each	3/8	4/8	

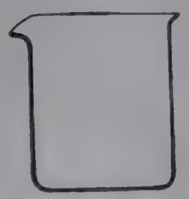
MK-055

BEAKERS, micro, squat form with lip, *Pyrex Brand* glass.

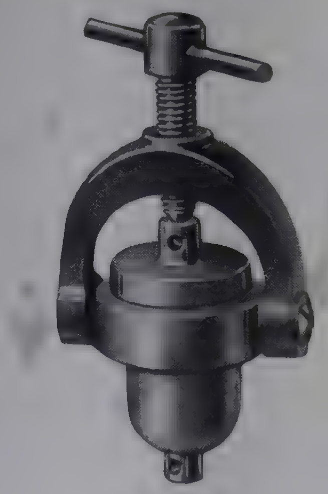
Capacity	5	10	25 ml	
Std. pack. qty.	60	60	120	
Std. pack	76/–	81/–	180/–	*d*
Dozen	16/6	17/6	19/6	
Each	3/–	3/1	3/3	



MK-050



MK-055



MK-080

MK-080

BOMB, MICRO PEROXIDE, *Gallenkamp,* for the determination of halogens, sulphur and phosphorus in organic compounds. Constructed in pure nickel and highly polished internally, the bomb has a capacity of about 2 ml. It is sealed by a lead gasket and the cover is retained by a strong clamp comprising a stainless steel ring, tightening screw and strong brass yoke.

Each **£15.15. 0.** *b*

REPLACEMENT PARTS

MK-082	**Bomb body,** pure nickel	Each	**£6.12. 6.**	*b*
MK-084	**Gaskets,** lead	Dozen	**£1.19. 0.**	*b*
MK-086	**Bomb cover,** pure nickel	Each	**£2. 1. 0.**	*b*

All items on this page normally available from stock.

HÖSLI MICROCOMBUSTION APPARATUS

We are sole sales agents in the United Kingdom, Northern Ireland and Commonwealth Territories.

The Hösli micro-analytical combustion apparatus was designed to meet the demands of the majority of micro-analysts. A minimum number of components were constructed in such a way that for any one micro-analytical method a specific apparatus could be assembled. Thus, the micro-analyst can obtain a microcombustion apparatus for a particular determination and yet modify the apparatus by adding or removing certain components, for other methods.

The basic apparatus is extremely flexible and provides the analyst with a reliable tool for a wide range of microcombustion determinations.

Detailed specifications of the following combustion trains, modified models and suitable glassware are available on application.

REFERENCES

1	Pregl & Grant	Quantitative organic microanalysis 4th Ed. 1945.
2	Zimmerman	Mikrochem. **31**, 1943, 149.
3	Unterzaucher	Mikrochim. Acta, 1957, 448.
4	Belcher & Ingram	Anal. Chim. Acta **4**, 1950, 118.
5	Zimmerman	Mikrochem. **31**, 1943, 42.
6	Pregl & Roth	Quantitative organische mikroanalyse 5th Ed. 1947.
7	Unterzaucher	Mikrochem. **36-37**, 1951, 706.
8	Ingram	Mikrochim. Acta 1953, 131.
9	Mitsui	Yûki Gôsei Kayaku Kyôka Shi, **15**, 1957, 92.
10	Mitsui & Sata	Mikrochim. Acta 1956, 1603.

CARBON AND HYDROGEN DETERMINATION

For the micro-determination of carbon and hydrogen in organic compounds by the methods of Pregl[1], Zimmerman[2], and others. With accessories the Unterzaucher[3] and Belcher and Ingram[4] methods can be used.

***MK-100**

MICRO COMBUSTION APPARATUS, Hösli, for determination of carbon and hydrogen in organic compounds, with four heater units and control unit. **Without glassware** ... Each, excluding duty **£262. 0. 0.** *m*

NITROGEN DETERMINATION

For the micro-determination of nitrogen in organic compounds by the Pregl-Dumas[1] method. With accessories the Zimmerman[5] method can be used and a modified model is available with additional heater suitable for the Unterzaucher[7] and Ingram[8] methods.

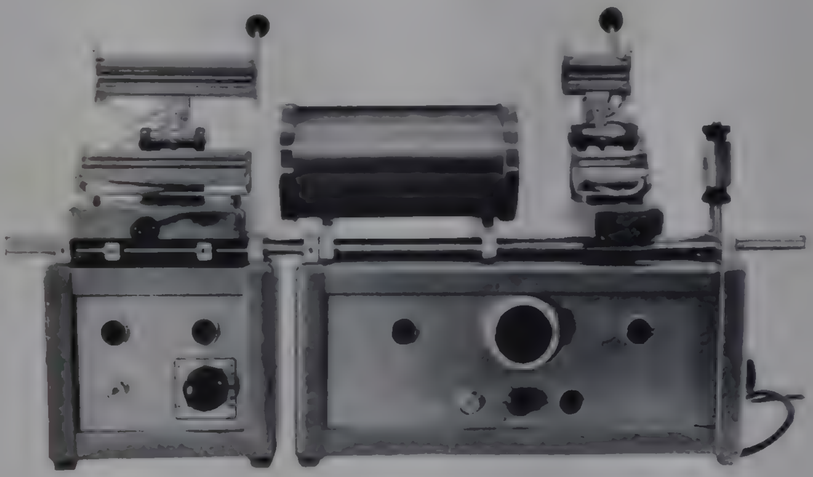
***MK-105**

MICRO COMBUSTION APPARATUS, Hösli, for determination of nitrogen in organic compounds, with two heater units and control unit. **Without glassware.** Each, excluding duty **£212. 0. 0.** *m*

GENERAL DESCRIPTION

The components of the Hösli apparatus comprise a number of heater units each designed to serve a particular role and which, by means of parallel rider bars, are mounted above the control units. The control units house all the electrical equipment including rheostats controlling the temperature of the heater units and controlling the speed of the sample heater together with the motor which drives this heater unit and a constant voltage transformer working from an input mains supply of 220/250V 50 Hz.

There are four basic microcombustion combinations, for carbon and hydrogen, for nitrogen, for oxygen and for sulphur and halogens.



OXYGEN DETERMINATION

For the micro-determination of oxygen in organic compounds by the method according to Unterzaucher[3].

***MK-110**

MICRO COMBUSTION APPARATUS, Hösli, for determination of oxygen in organic compounds, with four heater units and two control units. **Without glassware** ... ... Price on application

SULPHUR AND HALOGENS DETERMINATION

For the micro-determination of sulphur and halogens in organic compounds by the Mitsui[9] and Sata[10] method.

***MK-112**

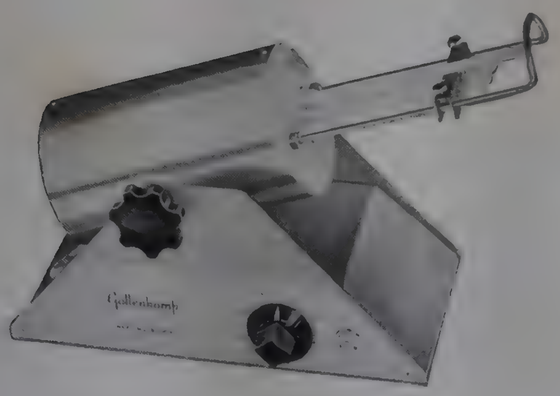
MICRO COMBUSTION APPARATUS, Hösli, for determination of sulphur and halogens in organic compounds, with four heater units and control unit. **Without glassware.** ... ... Price on application

When ordering or enquiring please state method to be used and details of available electrical supply.

Gallenkamp MICRO SUBLIMATION APPARATUS

For purification by distillation and sublimation at temperatures up to 350°C.

- **For 2 to 20 mg samples—solid or liquid**
- **Accommodates three sample tubes**
- **Can be clamped at any angle up to 45°**



MK-140

HEATER BLOCK

The heater block is made of aluminium and is heated by a band heating element operating at mains voltage. An energy regulator enables the temperature to be controlled over the range 50°C to 350°C to within ±2°C.

SAMPLE TUBES

The heating block accommodates three glass tubes of 9 mm outside diameter and a thermometer. For best results the thin walled tubes MK-142 should be used, with the special capsules MK-144 to contain the samples. Sample weights in the range 2 to 20 mg are normally used and the samples can be either solid or liquid.

PROCEDURE

The precise details of procedure will vary according to the substance being treated but, in general the partially purified specimen is placed in a capsule in the closed end of a clean dry tube, a constriction is made near the open end of the tube, a cotton wool plug is inserted and the tube is evacuated to 0·01 torr or less. The specimen is then heated in the block at the desired temperature until distillation or sublimation is complete. The portion of the tube containing the purified material may then be cut out or, if desired, sealed off under vacuum. With liquid samples some fractionation is possible if a thin copper tube is placed around the glass tube where it projects from the heating block.

MK-140

HEATING BLOCK FOR MICRO DISTILLATION AND SUBLIMATION, *Gallenkamp*, as specification, with 12 sample tubes, 24 capsules, 'cold finger' and a thermometer. For a.c. single phase supplies only.

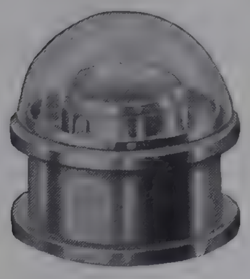
For 220/240V	Each **£42. 0. 0.**	*b*
For 200/210V	Each **£42. 0. 0.**	*bN*
For 110/120V	Each **£42. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

MK-142	**Sample tubes,** thin walled ...	Dozen	**£0. 5. 6.**	*a*
MK-144	**Capsules**	Dozen	**£0. 4. 6.**	*a*
TJ-050	Thermometer, scale span 0-250°C. For price see entry in List No. sequence.			

For suitable vacuum pump see VB-105 et seq.



MK-146

MK-146

DESICCATOR, MICRO, with metal base and hemispherical glass cover. Contains a dished, polished metal sample cooling block which is mounted over a glass desiccant holder ... ... Each **£6. 0. 0.** *b*

REPLACEMENT PART

MK-147	Glass cover	Each	**£0. 6. 0.**	*a*

DK-710

DESICCATOR, constant temperature vacuum, pistol pattern. For details see entry in List No. sequence.

Items on this page normally available from stock except those coded *N*.

MK-150

FILTER FUNNELS, Hirsch type, *Royal Worcester* porcelain.

Top diameter	18·5	29	43	60 mm	
Filter plate diameter	8	8	11	20 mm	
Dozen	**36/–**	**45/–**	**60/–**	**80/–**	*d*
Three	**9/6**	**12/–**	**16/–**	**21/–**	
Each	**4/6**	**5/2**	**6/4**	**7/10**	

MK-175

FORCEPS, chromium plated steel, 12·5 cm long, with bent tips and channel grips for filter sticks etc.
Dozen **£9. 0. 0.** Each **£0.16. 6.** *c*

MK-190

GAS GENERATOR, SEMI-MICRO, Ⓐ, for small quantities of gases. Comprises outer vessel, 150 × 19 mm dia., with bulb at the top and a loose fitting inner vessel, 150 × 13 mm dia., with a 10 mm dia. fritted glass support disk. Complete with rubber stopper, bend, clip and glass jet ... Dozen **£12. 10. 0.** Each **£1. 3. 0.** *a*

COMPONENTS

MK-192 **Outer vessel.**
Dozen **£4. 10. 0.** Each **£0. 8. 6.** *a*

MK-194 **Inner vessel** with fritted glass plate, Ref. No. 273X0.
Dozen **£5. 10. 0.** Each **£0. 10. 0.** *a*

MK-230

NITROMETER, micro, *Technico*, to BS 1428 Pt. D3. Capacity 1·5 cm³ subdivided in 0·01 cm³. With works certificate ... ... Each **£6. 15. 0.** *a*

MK-400

TUBE, COMBUSTION, fused transparent silica, to BS 1428 Pt. A1, with side arm ... Each **£3. 4. 0.** *m*

MK-405

TUBE, COMBUSTION, as MK-400 but without side arm ... ... Each **£2. 9. 0.** *m*

MK-410

TUBE, CARIUS, heavy wall glass, for sealed tube operations at temperatures up to 350°C, with one end closed. Length 350 mm, external diameter 11 mm.
Dozen **£1. 10. 0.** *m*

MK-430

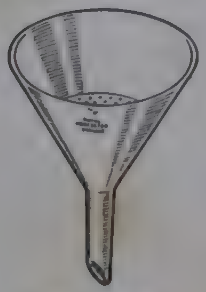
WEIGHING BOTTLE, Pregl pattern, to BS 1428 Pt. H1, with ground-in stopper. Dimensions, approximately 8 mm high, 7 mm diameter.
Dozen **£4. 16. 0.** Each **£0. 9. 0.** *a*

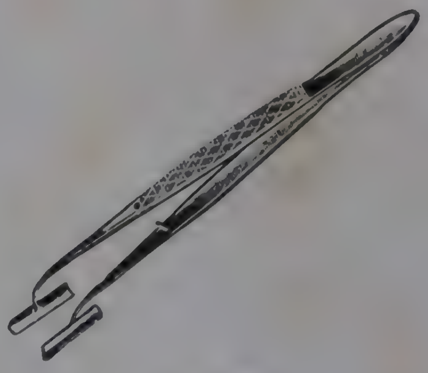
MK-440

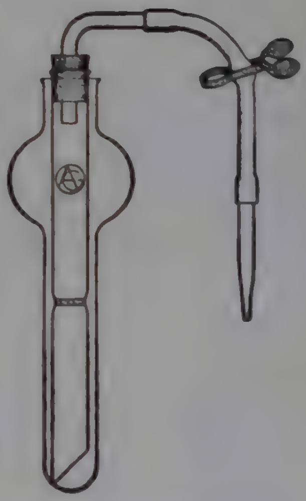
WEIGHING PIG, Pregl pattern, with ground-on cap, handles and two feet. Length overall 55 mm, diameter 10 mm... ... Dozen **£9. 0. 0.** Each **£0. 16. 6.** *a*

DK-716

WEIGHING TUBE with long handled stopper, see entry in List No. sequence.


MK-150


MK-175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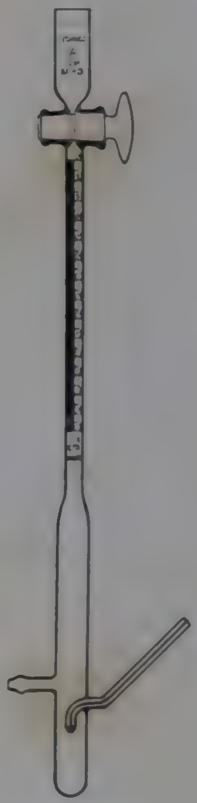
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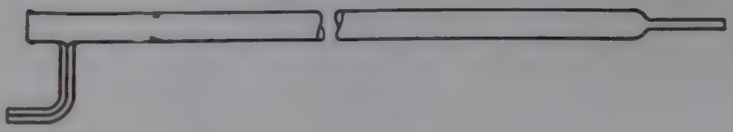
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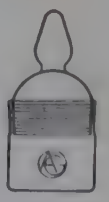
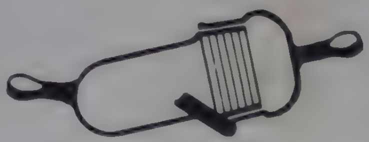

MK-430


MK-440

All items on this page normally available from stock.

MICROSCOPES

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Microscope slide and cover glasses will be found under **HISTOLOGY.**

MICROSCOPE OPTICS

The primary factors governing the performance of an objective are its magnification and its numerical aperture. Other factors, such as focal length and working distance are determined by these two primary factors.

MAGNIFICATION

All objectives listed in this catalogue, except those used with the inverted microscopes, are based on a mechanical tube length of 160 mm. By increasing the mechanical tube length, the initial magnification is increased according to

$$\text{Initial magnification} = \frac{\text{Tube length mm}}{\text{Focal length mm}}$$

Inclined monocular and binocular bodies are fitted with a correcting lens to compensate for the increase in mechanical tube length.

NUMERICAL APERTURE

The N.A. gives a measure of the resolving power of an objective. The greater the N.A. the greater the resolution. The **maximum useful** magnification obtainable from an objective is approximately 1000 times the N.A. Thus it can easily be calculated whether a particular combination of objective and eyepiece has reached or over-reached the effective power of the objective.

DEPTH OF FOCUS

The greater the N.A. of an objective, the smaller is the depth of field in which the object remains in focus. By reducing the N.A. and by stopping down the iris diaphragm, greater depth of focus is achieved at a cost of reduced resolution.

OLYMPUS MICROSCOPES

As exclusive Distributors in the United Kingdom only for biological microscopes made in Japan by Olympus Optical Co. Ltd. we are unable to offer for sale outside this territory.

Olympus MODEL MIC MICROSCOPE

A compact, inexpensive microscope for schools use. Supplied with plastics carrying case.

- **Inclined monocular head**
- **Fixed square stage with clips**
- **Built-in magnification control**
- **Stage focusing by rack and pinion**
- **Adjustable focus stop protects slide and objective**
- **Magnifications ×40 ×75 ×150 and ×300**

***ML-050**

MICROSCOPE, *Olympus* **Model MIC,** as specification, including optical elements ... ... Each £15. 0. 0. *m*

NOTE: No accessory optical elements can be fitted to this microscope.

Olympus MODEL ST MICROSCOPE

A robust microscope especially recommended for simple routine work and for schools use. Supplied with carrying case.

- **Fixed square stage with clips**
- **Rack and pinion focus mechanism**
- **Rotating click-stop 5-aperture diaphragm**
- **Double nosepiece with click-stops**
- **Preset focusing stop avoids damage to slide or objective**
- **Magnifications from ×70 to ×600**
- **Optical elements—eyepieces H×7, P×15**
  objectives N×10, N×40

***ML-070**

MICROSCOPE, *Olympus* **Model ST,** as specification, including optical elements ... ... Each £25. 0. 0. *m*

All lenses fitted to *Olympus* microscopes are hard coated for protection, maximum contrast and resolution.

LENS CODE

Applicable to optical elements of all *Olympus* microscopes.

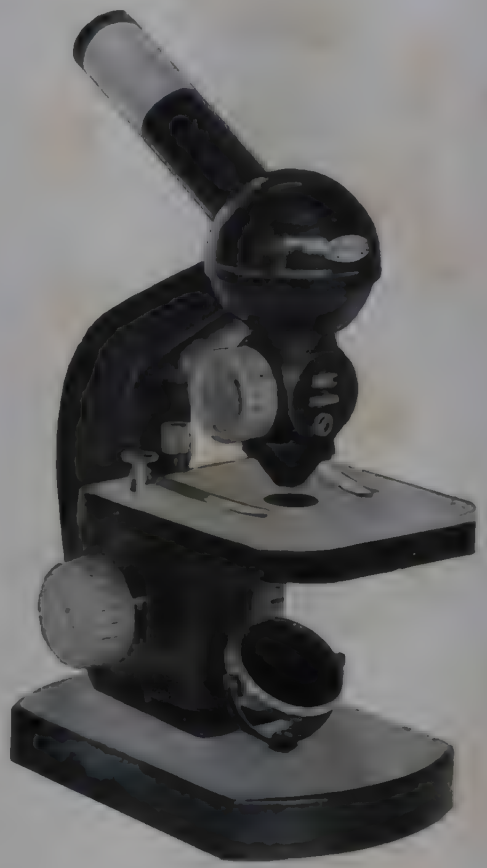
Eyepieces

H — Huygenian.
R — Ramsden.
P — Compensated for chromatic aberration and distortion of objectives.
K — As P, but for use with high power or fluorite objectives.
WF — Wide field.
Bi — Binocular.
G — Paired Greenough type stereoscopic eyepieces.

Objectives

All objectives are corrected for chromatic aberration.

N — Normal dry system.
NZ — Normal dry system for zoom microscope.
S — Spring mounted.
I — Iris diaphragm.
Pl — Plan (aplanatic), compensated for spherical aberration.
Fl — Fluorite, semi-apochromatic.



ML-050

ML-070

All items on this page normally available from stock.

ML-072

Olympus
MODEL STN MICROSCOPE

This microscope is a Model ST but with optical elements selected and approved by the **Nuffield Biology Project** for the O-level biology course. Supplied in carrying case.

- **Fixed square stage with clips**
- **Rack and pinion focus mechanism**
- **Rotating click-stop 5-aperture diaphragm**
- **Double nosepiece click-stops**
- **Preset focusing stop avoids damage to slide or objective**
- **Magnifications ×40 and ×100**
- **Optical elements—eyepiece H×10**
  objectives N×4, N×10

***ML-072**

MICROSCOPE, *Olympus* **Model STN,** as specification, including eyepiece H×10 and objectives N×4 and N×10.
Each **£18. 0. 0.** *m*

For Lens Code see page 499.

ACCESSORIES

ML-500	**Objective, N×20**	See entries in List No. sequence.
ML-800	**Substage illuminator, Model LSK-IV**	

ML-080

Olympus
MODEL GB MICROSCOPE

A general purpose, high performance microscope recommended for laboratory use and the teaching of advanced students.

- **Graduated draw tube**
- **Monocular head**
- **Quadruple nosepiece**
- **Coarse and fine focusing adjustment knobs**
- **Fixed square stage with built-in mechanical stage**
- **Condenser N.A. 1·25 with iris diaphragm**
- **Condenser focusing by rack and pinion**
- **Magnifications from ×50 to approx. ×1500**
- **Optical elements—eyepieces H×5, P×10, P×15**
  objectives N×10, N×40, S×100

***ML-080**

MICROSCOPE, *Olympus* **Model GB,** as specification, including the six optical elements shown above and carrying case ... ... Each **£77. 10. 0.** *m*

For Lens Code see page 499.

ACCESSORIES

ML-800	**Substage illuminator, Model LSK-IV ... ...**	For details and prices see entries in List No. sequence.
HJ-520	**Immersion oil ... ...**	

All items on this page normally available from stock.

Olympus
SERIES K MICROSCOPES

A range of modern microscopes for school and college advanced biological laboratories with features normally restricted to expensive research models.

- **Co-axial coarse and fine focusing**
- **Substage focusing by rack and pinion**
- **Inclined rotatable monocular head**
- **Quadruple nosepiece**
- **Large size stage to accommodate attachable mechanical stage**
- **Preset focusing lock protects slides and objectives**

STAND

The stand is of rigid construction, built on a solid extra heavy cast base.

HEAD

The monocular head is inclined at 45° and is rotatable through 360°.

EYEPIECES

All eyepieces are hard coated for high transmission and quality definition.

The standard equipment includes a WF×10 wide field eyepiece. Alternative eyepieces are available and are listed on page 511.

NOSEPIECE

The quadruple click-stop nosepiece gives smooth accurate alignment.

OBJECTIVES

All achromatic objectives are parfocal and interchangeable and supplied in dust-proof plastics tubes. Alternative objectives are available and listed on page 510.

STAGE

A large size stage (110 × 140 mm) is predrilled and tapped to accommodate a mechanical stage which is available as an accessory.

SUBSTAGE

Abbé condenser N.A. 1·25 focusing by rack and pinion through a variable iris diaphragm with swing-out filter holder.

ILLUMINATION

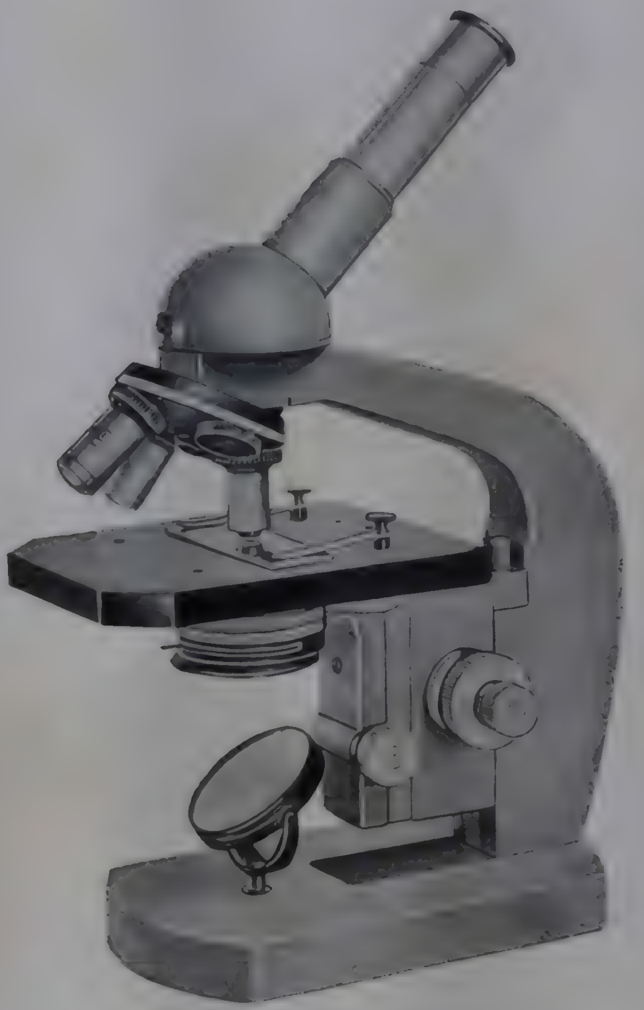
A plano-concave mirror is included in the standard equipment. A 20W illuminator ML-114 or Universal illuminator ML-802 with transformer are available as alternatives.

FOCUSING

Vertical movement of the stage, by conveniently located coaxial coarse and fine adjustment controls.

Coarse focus range 28 mm.

Fine focus range 2 mm.



ML-100 to **ML-104**

ACCESSORIES

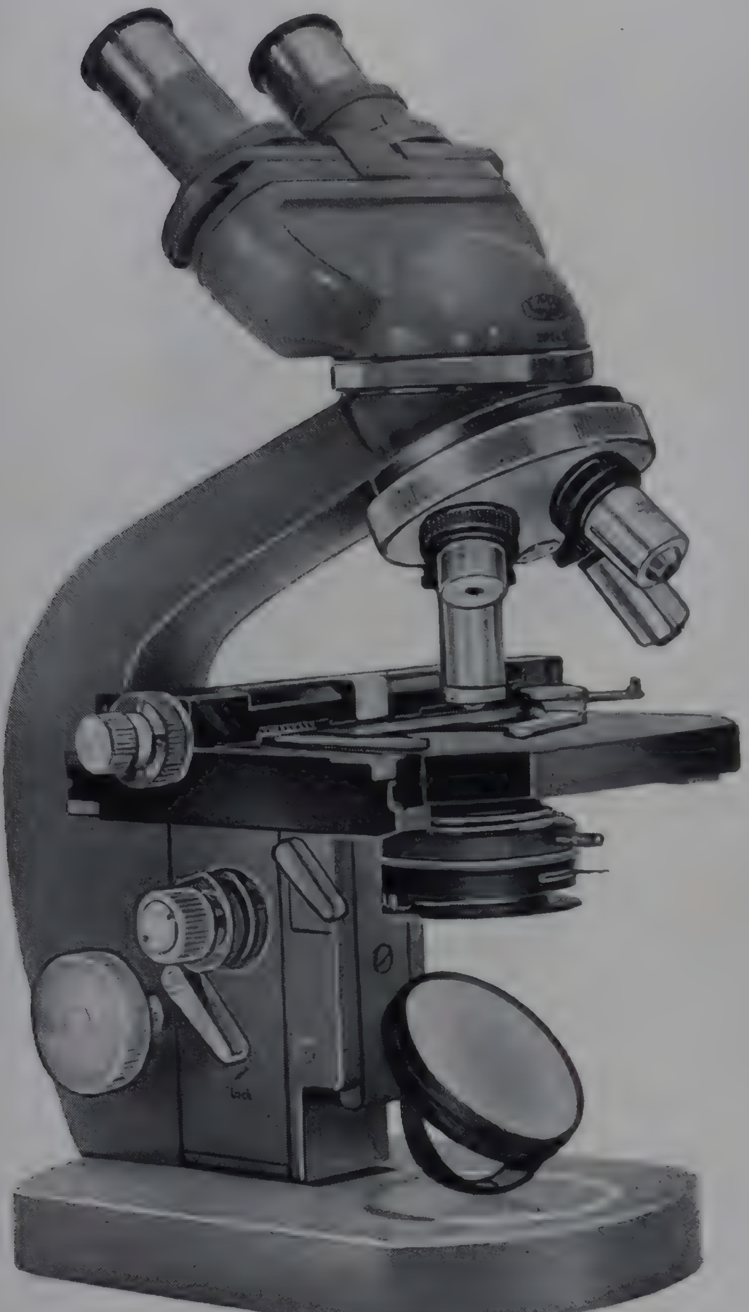
***ML-108**	**Carrying case,** wooden, fitted with lock and key.	Each **£5. 0. 0.**	*m*
***ML-110**	**Ungraduated mechanical stage, Model KM,** range of movement 75 × 25 mm	Each **£10. 15. 0.**	*m*
***ML-112**	**Graduated mechanical stage, Model FM-2,** range of movement 50 × 25 mm. Vernier scales reading to 0·1 mm	Each **£11. 15. 0.**	*m*
***ML-114**	**Substage illuminator, Model LSK-II,** plug-in type, with 20W lamp. Requires no transformer. For 240V a.c. or d.c. supplies	Each **£4. 0. 0.**	*m*
ML-801	**Replacement lamp, 20W, for** illuminator ML-114	For details and prices see entries in List No. sequence.	
ML-802	**Universal light source, Model LSD,** with transformer ...		
ML-730	**Dark field condenser, Model DC**		
ML-850	*Et seq.* **Phase contrast equipment**		
HJ-520	**Immersion oil**		

NOTE: ML-100 is approved by the Nuffield Biology Project for the O-level biology course.

For Lens Code see page 499.

List No.	Model	Wide field eyepiece	Achromatic objectives	Abbé condenser	Magnification range	Each	
***ML-100**	KI	WF×10	N×4, N×10, N×40	N.A. 1·25	×40 to ×400	**£47. 15. 0.**	*m*
***ML-102**	KII	WF×10	N×10, N×40, S×100	N.A. 1·25	×100 to ×1000	**£62. 0. 0.**	*m*
***ML-104**	KIII	WF×10	N×4, N×10, N×40, S×100	N.A. 1·25	×40 to ×1000	**£65. 5. 0.**	*m*

All items on this page normally available from stock.



ML-180

Olympus
SERIES EC MICROSCOPE

A binocular research microscope particularly suitable for medical and biological studies. A wide range of optical and illumination accessories is available.

- **Robust construction for lasting optical alignment**
- **Preset focusing lock protects slides and objectives**
- **Enclosed rack and pinion**
- **Focusing adjustment knobs located conveniently together**

STAND
Designed to provide instant interchangeability of monocular, binocular and trinocular tubes. It is finished in acid-resistant pearl grey.

HEAD
Inclined binocular head, rotatable through 360° with interocular distance adjustable from 56 mm to 74 mm and individual acuity adjustment to facilitate sharpest possible image.

EYEPIECES
All eyepieces are hard coated for high transmission and quality definition.

NOSEPIECE
Quintuple click-stop nosepiece is mounted on ball-bearings for smooth accurate alignment. Objective identification symbols are engraved on the nosepiece.

OBJECTIVES
All achromatic objectives are parfocal and interchangeable and supplied in dustproof plastics tubes.

STAGE
Horizontal mechanical stage (120 × 140 mm) with fine vernier graduation. Designed with convenient coaxial controls for slide manipulation through 50 × 70 mm.

SUBSTAGE
Abbé condenser N.A. 1·25 focusing by rack and pinion with variable iris diaphragm and swing-out filter holder and removable blue filter.

ILLUMINATION
A plano-concave mirror is included in the standard equipment. A 20W illuminator ML-182 or Universal illuminator ML-802 with transformer are available as alternatives.

FOCUSING
Vertical movement of the stage is by coarse and fine focusing controls. The rack and pinion mechanism is enclosed as protection against wear due to dust.
Coarse focus range 35 mm.
Fine focus range 2 mm.

List No.	Model	Paired eyepieces	Achromatic objectives	Abbé condenser	Magnification	Each	
***ML-180**	EC-Bi-I	BiP×7, BiWF×10	N×4, N×10	N.A. 1·25	×28 to ×1500	**£150. 0. 0.**	*m*
		BiP×15	N×40, S×100				

In wooden carrying case with lock and keys.
A monocular head is also included.

For Lens Code see page 499.

ML-182

ACCESSORIES

***ML-182** **Substage illuminator, Model LSK-I,** plug-in type, requires no transformer. For 240 V a.c. or d.c. supplies. Each £4. 0. 0. *m*

ML-801 Replacement lamp, 20W, for illuminator ML-182. For price see entry in List No. sequence.

HJ-520 **Immersion oil.** For details and price see entry in List No. sequence.

Objectives ... ...
Eyepieces ... ...
Condensers ... ...
Alternative illuminators ... ...
Phase contrast accessories ... ...
Photomicrographic equipment ...
See pages 510 to 515

All items on this page normally available from stock.

Olympus
SERIES EH RESEARCH MICROSCOPES

High performance research microscopes which incorporate an outstanding built-in illuminator which is stable regardless of changes in magnification.

- **Readily adapted for any desired head-stage combination**
- **Flat field over the whole range of magnification**
- **Preset focus lock protects slides and objectives**
- **Fine focus adjustment to 0·002 mm**
- **Thickness of specimen can be measured on sensitivity scale**
- **Variable intensity light source**

STAND
The stand is of rigid construction with acid-resisting finish.

HEAD
Binocular or trinocular interchangeable heads rotating through 360°. On the binocular and trinocular models the interocular distance is adjustable from 58 mm to 78 mm and individual acuity adjustment is provided.

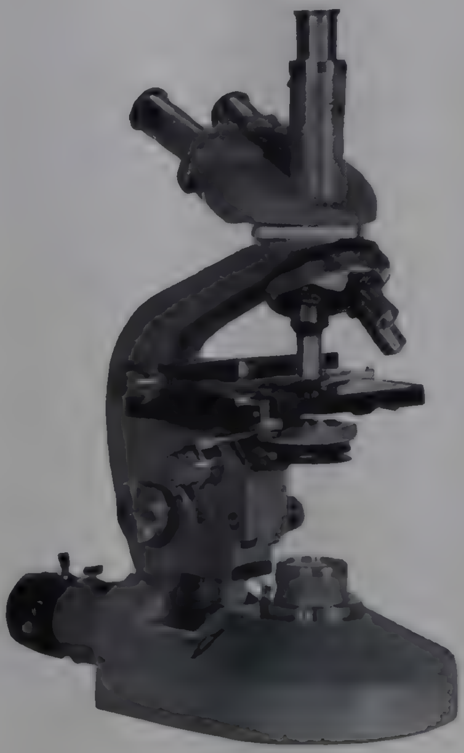
EYEPIECES
A wide range of high quality Huygenian, wide field and compensating eyepieces are available, single for monocular work and paired for binocular work. All eyepieces are hard coated for high transmission and quality definition.

NOSEPIECE
The quintuple click-stop nosepiece is mounted on ball bearings for smooth and accurate alignment. Objective identification symbols are engraved on the nosepiece.

OBJECTIVES
All achromatic objectives are parfocal and interchangeable, and supplied in dust-proof plastics tubes.

STAGE
Horizontal mechanical stage (120 × 140 mm) with fine vernier graduation. Designed with convenient coaxial controls for slide manipulation through 50 × 70 mm.

SUBSTAGE
An Abbé condenser N.A. 1·25 focusing by rack and pinion with a 25 mm iris diaphragm and swing-out filter holder and blue filter.



ML-256

ILLUMINATION
Precentred illuminating system at the base of the microscope with field diaphragm and compensating switch to give Köhler illumination to each objective.

FOCUSING
Vertical movement of stage by coarse and fine focusing controls.
Coarse focus range 31·8 mm.
Fine focus range 1·2 mm.
Scale calibrated in unit of 0·002 mm.

When ordering please state voltage and nature of supply.

ACCESSORIES

Transformer ... ...
Eyepieces ... ...
Objectives ... ...
Condensers ... ...
Phase contrast accessories ... ...
Photomicrographic equipment...
See pages 510 to 515

For immersion oil see HJ-520 in List No. sequence.

For replacement bulbs for illuminating system see ML-803 in List No. sequence.

For Lens Code see page 499.

RECOMMENDED ASSEMBLIES

List No.	Model	Eyepieces (paired)‡	Objectives	Head	Each	
***ML-250†**	EHC-Bi-I	BiP×7 BiWF×10 BiP×15	N×4 N×10 N×40 S×100	Binocular	**£199.15. 0.**	*m*
***ML-252†**	EHC-Bi-II	BiP×7 BiWF×10 BiP×15 BiK×20	N×4 N×10 Fl×40 Fl×100	Binocular	**£242. 0. 0.**	*m*
***ML-254†**	EHC-Bi-III	BiP×7 BiWF×10 BiP×15 BiK×20	Pl×4 Pl×10 Pl×40 Pl×100	Binocular	**£301.10. 0.**	*m*
***ML-256**	EHC-Tri-I	BiP×7 BiWF×10 BiP×15 P×7 (for photo tube) P×10 (for photo tube) P×15 (for photo tube)	N×4 N×10 N×40 S×100	Trinocular	**£225. 0. 0.**	*m*

† Monocular head also supplied.

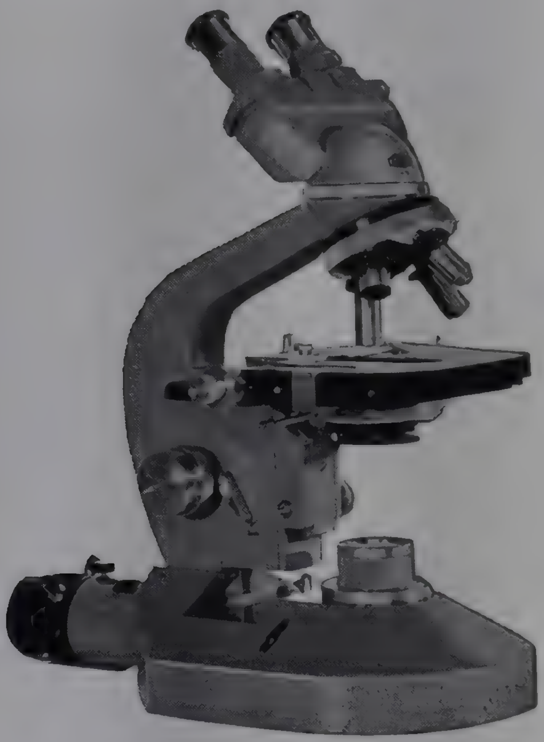
‡ Eyepieces for photo tubes are not paired.

All items on this page normally available from stock.

Olympus
SERIES FH RESEARCH MICROSCOPES

A range of extremely high performance research microscopes incorporating an ultra sensitive stage focusing to 0·0005 mm.

- **High precision with simple operation**
- **Trinocular model for photomicrography and phase contrast work**
- **Accurate focusing especially effective in photomicrographic work**
- **Built-in illuminator**



ML-274

STAND
The stand is rigid, with acid-resisting finish.

HEAD
Binocular and trinocular interchangeable heads are rotatable through 360°. The trinocular head provides both binocular viewing eyepiece and monocular photomicrography tube.

EYEPIECES
A wide range of the highest quality Huygenian, wide field and compensating eyepieces are available.

NOSEPIECE
Quintuple nosepiece with apertures marked to receive the correct objectives.

OBJECTIVES
Parfocal achromatic, fluorite or planachromat objectives of new design to obviate distortion, are available.

STAGES
A square detachable mechanical stage is dovetailed to the body. Coaxial controls operate both directions of movement (50 mm × 70 mm) with verniers reading to 0·1 mm.

SUBSTAGE
Standard model fitted with N.A. 1·25 condenser with variable iris diaphragm. Other types of condenser are available (see page 512).

ILLUMINATION
Precentred illuminating system at the base of the microscope with field diaphragm and compensating switch to give Köhler illumination to each objective.

FOCUSING
Vertical movement of stage by coaxial coarse and fine controls located beneath the stage level. The coarse adjustment has a locking device.
Coarse adjustment—rack and pinion—range 32·5 mm.
Fine adjustment—balanced spring tension—range 2 mm.
Calibrated in units of 0·001 mm to permit measurement of thickness of specimen.
Sensitivity: 0·0005 mm.

When ordering please state voltage and nature of supply.

ACCESSORIES

Transformer
Eyepieces
Objectives
Condensers
Phase contrast accessories
Photomicrographic equipment
} See pages 510 to 515.

.For immersion oil see HJ-520 in List No. sequence.
For replacement bulbs for illuminating system see ML-803 in List No. sequence.

For Lens Code see page 499.

RECOMMENDED ASSEMBLIES

List No.	Model	Eyepieces (paired) ‡	Objectives	Head	Each	
***ML-270†**	FHF-Bi-I	BiP×7 BiWF×10 BiP×15	N×4 N×10 N×40, S×100	Binocular	**£270. 0. 0.**	*m*
***ML-272†**	FHF-Bi-II	BiP×7 BiWF×10 BiP×15 BiK×20	N×4 N×10 Fl×40, Fl×100	Binocular	**£312. 5. 0.**	*m*
***ML-274†**	FHF-Bi-III	BiP×7 BiWF×10 BiP×15 BiK×20	Pl×4 Pl×10 Pl×40 Pl×100	Binocular	**£371.15. 0.**	*m*
***ML-276**	FHF-Tri-I	BiP×7 BiWF×10 BiP×15 P×7 (for photo tube) P×10 (for photo tube) P×15 (for photo tube)	N×4 N×10 N×40 S×100	Trinocular	**£295. 0. 0.**	*m*

† Monocular head also supplied. ‡ Eyepieces for photo tubes are not paired.

All items on this page normally available from stock.

Olympus
Model CK INVERTED MICROSCOPE

A simplified microscope for routine examination of cultures in bottles, dishes or tubes.

- **Image appears upright**
- **Convenient positioning of controls for minimum fatigue and simple operation**
- **Rack and pinion focusing**

HEAD
Binocular or monocular, inclined at 45°.

EYEPIECES
Paired or single ×10.

NOSEPIECE
Triple nosepiece with click-stops for quick accurate centring of objectives.

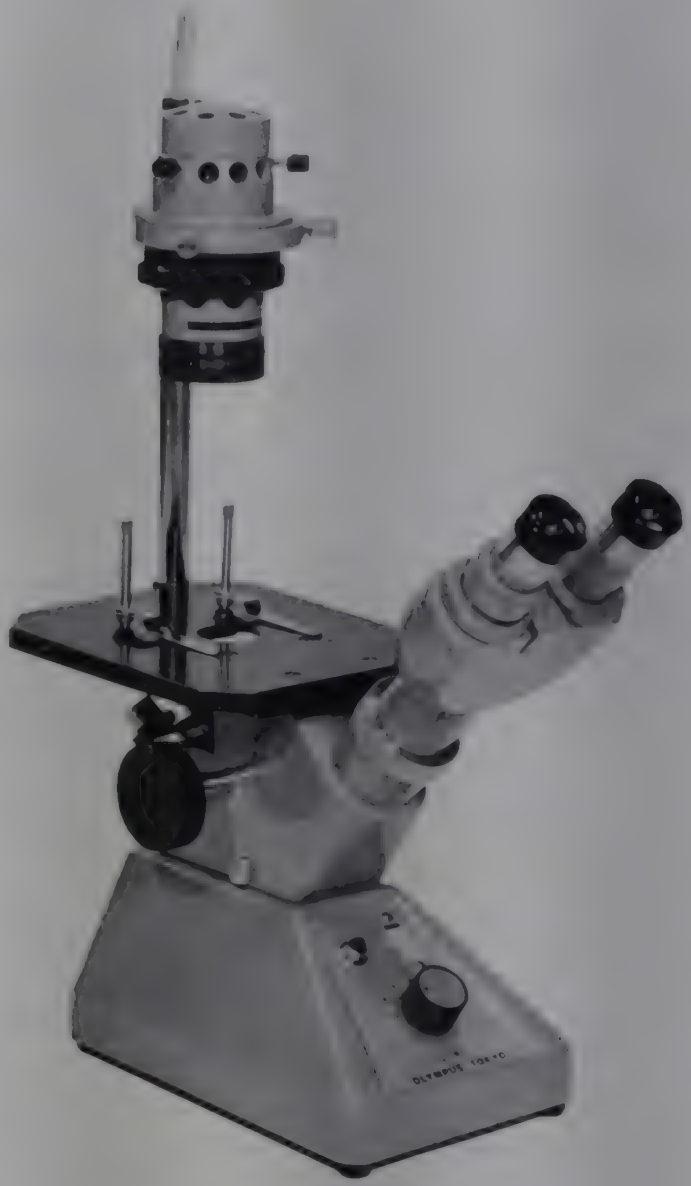
OBJECTIVES
Achromatic, long working distance ×4 and ×10.

STAGE
Large, plain stage 180×150 mm, with stage clips on pillars, height adjustable for holding petri dishes, culture flasks, etc. Side extension plates each measuring 140×70 mm facilitate manipulation of specimens.

ILLUMINATION
Compact illuminator slides on vertical pillar which can be attached to front or rear of stage. Incorporates helical focusing, centring screws for lamp, slide-in filters and iris diaphragm. Lamp is 6V, 12W, fed by stepped transformer in base of microscope.

FOCUSING
Single focusing system operated by large diameter paired knobs, gives 15 mm movement.

MAGNIFICATION
Standard outfit gives ×40 and ×100. Accessory ×20 objective available for magnification of ×200.



ML-282

***ML-280**
MICROSCOPE, *Olympus*, **Inverted Model CK,** as specification with inclined **monocular** head, triple nosepiece, plain stage, single ×10 eyepiece, ×4 and ×10 achromatic long working distance objectives and built-in illumination. For 220 and 240V a.c. supplies.
Each **£120. 0. 0.** *m*

***ML-282**
MICROSCOPE, *Olympus*, **Inverted Model CK,** as specification with inclined **binocular** head, triple nosepiece, plain stage, paired ×10 eyepieces, ×4 and ×10 achromatic long working distance objectives and built-in illumination. For 220 and 240V a.c. supplies.
Each **£160. 0. 0.** *m*

When ordering please state voltage and nature of supply.

ACCESSORY

***ML-286 Objective,** achromatic, long working distance, magnification ×20 ... ... Each **£6. 0. 0.** *m*

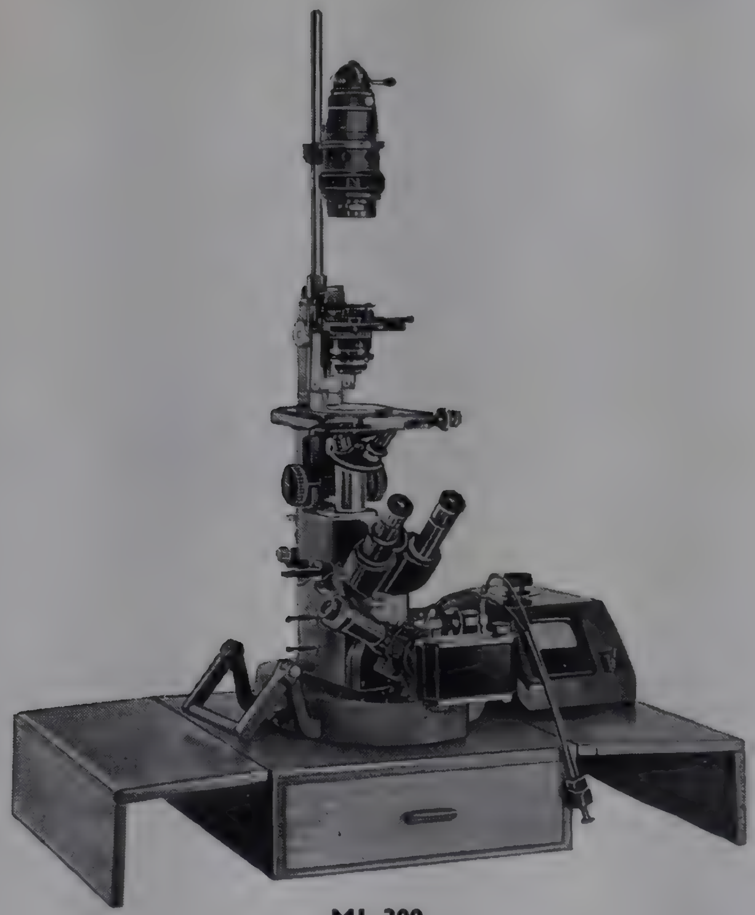
NOTE: The optical elements used with this model are not suitable for use with other *Olympus* microscopes.

All items on this page normally available from stock.

Olympus
MODEL PMB
INVERTED RESEARCH MICROSCOPE

This high power research biological microscope has the light source at the top and the objectives vertically under the stage plate. It is particularly suitable for observation of materials in Petri dishes or culture bottles.

- **The body is rotatable through 360° and can be locked in any position. Mechanical tube length is 200 mm**
- **35 mm camera for taking still pictures or a 16 mm cine camera may be attached to the body. The light path may be directed easily to either the eyepieces or the camera**
- **Bright field or phase contrast observations possible**



ML-300

HEAD

Binocular, inclined at 45° and rotatable through 360°.

EYEPIECES

Paired ×7 and ×10 compensated, ×10 widefield and ×20 compensated for use with high power or fluorite objectives.

NOSEPIECE

Quadruple nosepiece with click-stops for quick accurate centring of objectives.

OBJECTIVES

×6 and ×12 for bright field observations, ×12 (with built-in phase plate), ×24, ×48 and ×100 for phase contrast observations.
NOTE: These objectives are for use with microscope ML-300 only.

STAGE

Built-in mechanical stage (146 × 120 × 15 mm) with large size stage clips and circular aperture stage plate.
Movable distance of stage plate: Back and forth 20 mm.
Side to side 30 mm.
(Minimum readable graduation is 0·1 mm using vernier scale).

CONDENSER

The microscope is fitted with a long focal length condenser N.A. 0·34 with iris diaphragm and filter holder. Vertical movement of the condenser is by rack and pinion through 40 mm. When used in conjunction with the integral phase contrast slide, this condenser is suitable for phase contrast observations. The slide may easily be removed for normal bright field work.

NOTE: The ×6 objective can be used only as a bright field objective.

The N.A. 0·34 condenser is replaced by a N.A. 1·25 condenser for the ×100 objective.

ILLUMINATION

The light source moves 90 mm vertically, and the bulb filament is centred easily by using the centring screws. An adjustment of the condenser lens forward or backward directs the light beam, producing either converging or parallel rays.

FOCUSING

Vertical movement of the stage is by coaxial coarse and fine adjustment controls.
Coarse focus range 20 mm.
Fine focus range ± 1 mm.
(Minimum readable graduation on the fine focus knob in ·001 mm).

MAGNIFICATION

×42 to ×2000 for bright field.
×84 to ×2000 for phase contrast.

***ML-300**

MICROSCOPE, *Olympus* **Inverted Model PMB,** as specification and including:—Photomicrographic outfit with 35 mm camera for taking still pictures. Viewing eyepiece "A" for ×24 to ×100 observation. Viewer "B" with projection screen for ×6 and ×12 observation. Cable release.

	Each
Photographic lenses: ×7, ×10, ×15	1
Phase-contrast slide PLL (Positive Low Low contrast) with phase rings for ×24, ×48 and ×100 objectives.	1
Phase-contrast slide NM (Negative Medium contrast) with phase rings for ×24, ×48 and ×100 objectives.	1
Light source (comprising stand and lamp housing)	1
Transformer with ammeter for 100V, 110V, 220V or 240V a.c. supplies.	1
Lamp bulbs (6V, 5A) type SB-1	3
Centring telescope CT	1
Filters: White filter (WF60×45)	1
Cobalt filter (CS60×45)	1
Green filter (G-5360×45)	1
Yellow filter (Y-4860×45)	1
Wooden case for standard accessories, with handrest	1
Wooden carrying case for microscope complete	1

Outfit **£950. 0. 0.** *m*

When ordering please state voltage and nature of supply.

For Lens Code see page 499.

ACCESSORIES

***ML-302**	**Photographic plate camera,** shutter speeds 1 sec to 1/50 sec and B, plate size 82 × 102 mm with six plate holders ... ... Each £67. 10. 0.	*m*
***ML-304**	**Heat insulating box,** for maintaining specimens at required temperature ... ... Each £132. 10. 0.	*m*
ML-940	**Exposure meter EMM-V.** See entry in List No. sequence.	

NOTE: The optical elements used with this model are not suitable for use with other *Olympus* microscopes.

Olympus
SERIES X STEREOSCOPIC MICROSCOPES

For plant classification, entomology, anatomy, geology and other applications.

Binocular and trinocular stereoscopic wide field microscopes with magnification selector knob. Fixed optics ensure the highest resolution and freedom from distortion in stereomicroscopy. Model with trinocular head is for photomicrography.

- **Real erect image with stereoscopic effect**
- **Individual interpupillary and diopter adjustment to compensate for personal visual acuity of user**
- **Rapid change of magnification**

ML-310

STAND

Robust stand with adjustable pillar.

HEAD

The inclined binocular head permits a natural viewing position and reduces user fatigue.

EYEPIECES

Wide field eyepieces G×10 and G×20 provided.

STAGE

The stage is provided with clips and clear glass and opal glass plates. The working depth between the stage and the objective varies from 47 to 90 mm depending upon magnification.

MAGNIFICATION

The drum selector gives five different magnifications simply by turning a knob.

***ML-310**

MICROSCOPE, *Olympus* **Model XI,** as specification with N×1 objective. Supplied complete with trans-illuminator ML-820 and fitted case with lock and key.
Each **£161. 18. 6.** *m*

***ML-320**

MICROSCOPE, *Olympus* **Model X-Tr,** as ML-310 but including trinocular head and ×10 parfocal eyepiece for photomicrography and a fixed NX1 objective.
Each **£203. 10. 0.** *m*

ACCESSORIES

***ML-312** **Objective,** N×2 for use with microscope ML-310 only.
Each **£18. 9. 0.** *m*

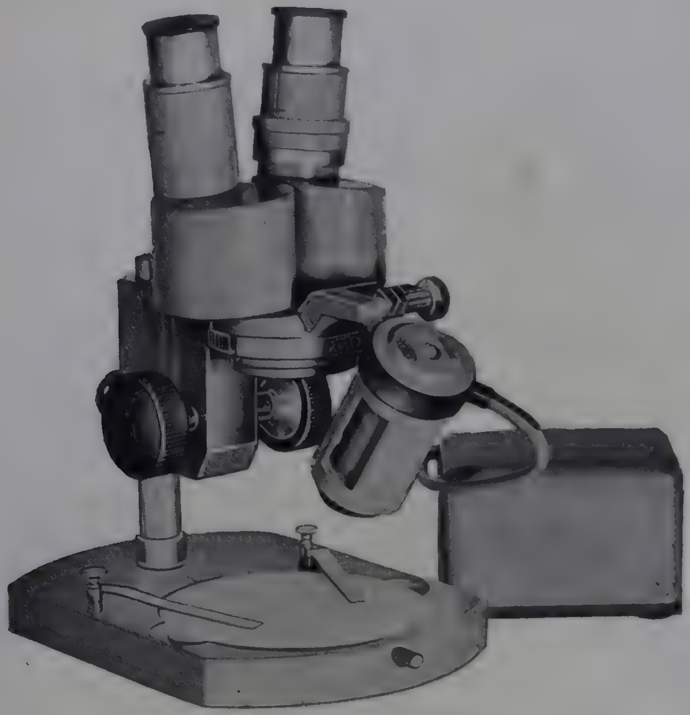
***ML-322** **Iris diaphragm,** for trans-illuminating substage base ML-820 ... ... Each **£5. 11. 0.** *m*

ML-804 **Illuminator, Model LSG** ...
ML-822 **Universal stand, Model VS-IV,** for examining large objects ...
ML-900 **Photomicrographic apparatus, Model PM6** ... ...
} See entries in List No. sequence.

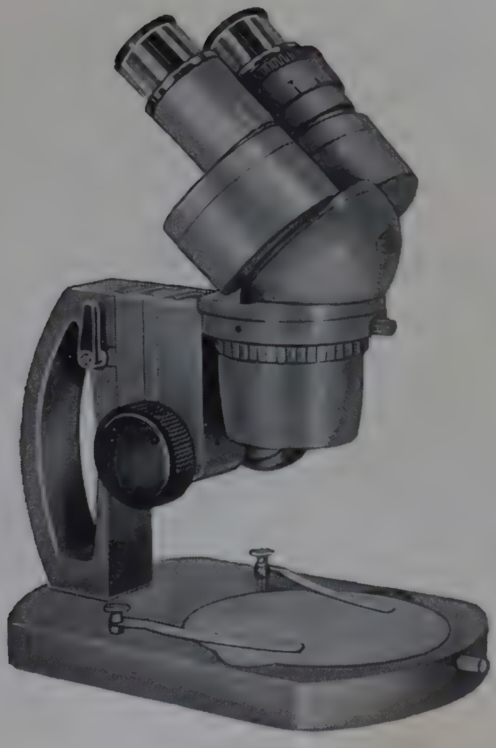
For Lens Code see page 499.

Objectives	G×10 Eyepieces		G×20 Eyepieces	
	Magnification range	Field of view (mm dia.)	Magnification range	Field of view (mm dia.)
N×1	× 6·3 to ×40	32 to 5·0	×12·6 to ×80	16 to 2·5
N×2	×12·6 to ×80	16 to 2·5	×25·2 to ×160	8 to 1·25

All items on this page normally available from stock.



ML-330 with ML-804



ML-340

Olympus
LOW POWER STEREOSCOPIC MICROSCOPES MODELS VA-II & VT-II

Low cost stereoscopic microscopes with distortion-free optics. These functional microscopes are valuable in the fields of science, education and medicine. Approved by the Nuffield Biology Project for the O-level biology course.

- **Stereoscopic viewing minimises eye-strain**
- **Natural, vivid images are erect and unreversed**
- **Optical elements are hard-coated for high transmission**

STAND
Acid-resistant and chromium-plated with rubber bumpers. Model VT-II incorporates a hand-grip stand for correct and safe handling.

HEAD
Binocular head which detaches from stand for use on Universal stand model VS-IV, ML-822.

EYEPIECES
Independent focusing of left eyepiece provides means of obtaining critically sharp images. Paired G×10 eyepieces provide large, distortion-free field.

OBJECTIVES
Model VA-II. The paired parfocal N×1 and N×2 objectives are interchangeable by a rapid "click-lock" method. They are so mounted as to provide long working distances with an aperture adequate for high resolution.

Model VT-II. Incorporates turret with twin paired objectives for instantaneous magnification change.

STAGE
Flush-mounted glass plate with screw lock; large size stage clips.

FOCUSING
Rack and pinion focus mechanism, range 50 mm.

***ML-330**

MICROSCOPE, *Olympus* **Model VA-II,** as specification, including optical elements. Supplied with vinyl dust cover and fitted hardwood case with lock and key.
Each **£46. 5. 0.** *m*

***ML-340**

MICROSCOPE, *Olympus* **Model VT-II,** as specification, including optical elements without carrying case.
Each **£50. 17. 6.** *m*

For Lens Code see page 499.

ACCESSORIES

***ML-345**	**Carrying case for ML-340** ...	Each **£4. 15. 0.**	*m*
ML-650	**Eyepieces**	See entries in List No. sequence.	
ML-804	**Epi-illuminator Model LSG** ...		
ML-820	**Trans-illuminating substage base**		
ML-822	**Universal stand Model VS-IV**		

MAGNIFICATION AND FIELD OF VIEW CHART

Objective	Working distance	Wide field eyepiece G×10		Wide field eyepiece G×15		Wide field eyepiece G×20	
		Magnification	Field of view (mm dia.)	Magnification	Field of view (mm dia.)	Magnification	Field of view (mm dia.)
N×1	128 mm	×10	20	×15	15	×20	10
N×2	78 mm	×20	10	×30	7·5	×40	5

All items on this page normally available from stock.

Olympus
MODEL SZ-III STEREOSCOPIC ZOOM MICROSCOPE

A stereoscopic prismatic zoom microscope with a zoom ratio of 5·7 for the study of plant and animal anatomy.

- **Continuous dial-controlled magnification from ×7 to ×40 without defocusing**
- **Alternative optical elements provide magnification ranges to ×160**
- **Perfect stereoscopic and erect images**

STAND
Durable acid-resistant finish.

HEAD
Binocular head inclined at 45° and rotatable through 360° with individual diopter and inter-pupillary adjustments on each eyepiece.

EYEPIECES
Wide field G×10 eyepieces supplied with standard equipment.

OBJECTIVES
A built-in NZ×1 objective is supplied with the standard equipment.

Conversion lenses for alternative magnifications are listed under accessories below.

STAGE
Flush-mounted glass plate with screw lock; large size stage clips.

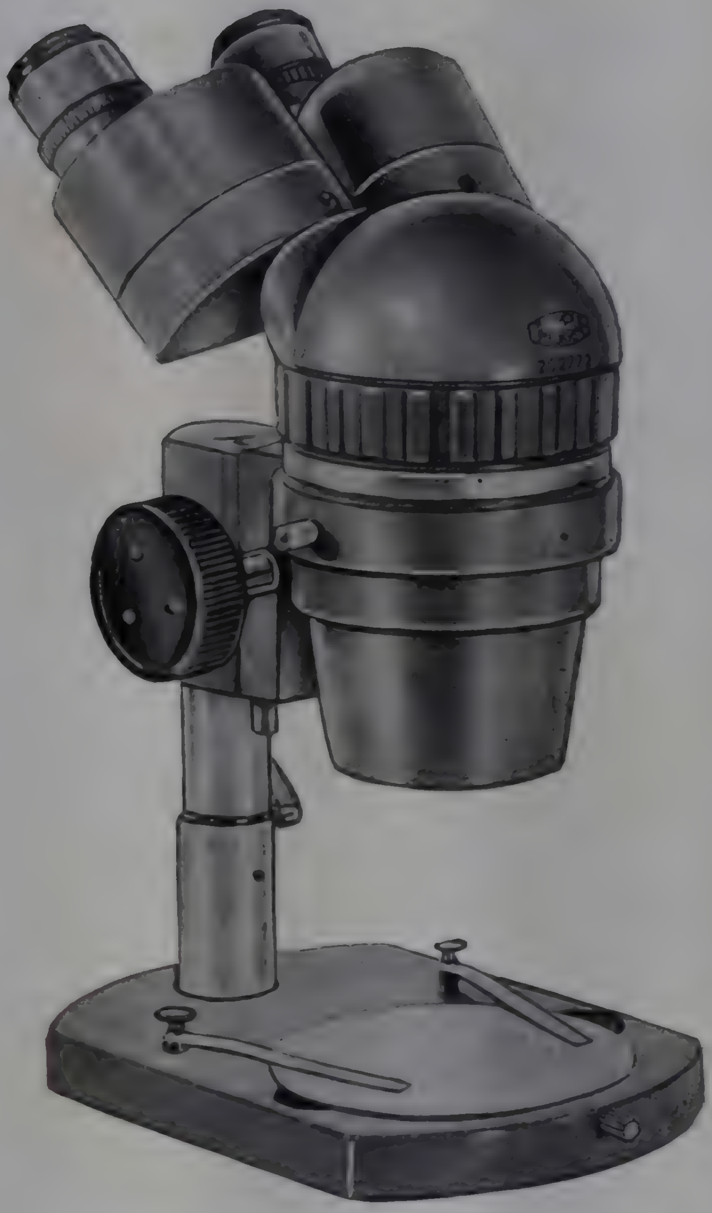
FOCUSING
Single focusing movement by rack and pinion mechanism.

***ML-350**
MICROSCOPE, *Olympus* **Model SZ-III,** as specification, with clear and opaque glass stage plates, eyepiece caps, eyepiece shades, plastics dust cover and wooden cabinet ... ... Each **£134. 2. 6.** *m*

ACCESSORIES

***ML-352**	**Conversion lens, ×0·5 with extension pillar.**	**Each £13. 10. 0.** *m*
***ML-354**	**Conversion lens, ×0·75 ... ...**	**Each £5. 11. 0.** *m*
***ML-356**	**Conversion lens, ×1·5 ... ...**	**Each £7. 8. 0.** *m*
***ML-358**	**Conversion lens, ×2 ... ...**	**Each £7. 8. 0.** *m*
***ML-366**	**Micrometer eyepiece, G×10 eyepiece with fitted 10 mm linear graticule divided into 100.**	**Each £14. 15. 0.** *m*
ML-650	**Eyepieces, G×20 paired ... ...**	**See entries in List No. sequence.**
ML-804	**Epi-illuminator, Model LSG-II**	
ML-820	**Trans-illuminating substage base**	
ML-822	**Universal stand Model VS-IV ...**	

For Lens Code see page 499.



ML-350

MAGNIFICATION AND FIELD OF VIEW CHART

Objective assembly		G×10 Eyepieces		G×20 Eyepieces	
Conversion lens	Working distance	Magnification ranges	Field of view (mm dia.)	Magnification ranges	Field of view (mm dia.)
×0·5	166 mm	× 3·5 to ×20	62·9 to 11·0	× 7 to ×40	34·8 to 6·1
×0·75	111 mm	× 5·3 to ×30	41·9 to 7·3	×10·5 to ×60	23·2 to 4·1
None	97 mm	× 7 to ×40	31·4 to 5·5	×14 to ×80	17·4 to 3·1
×1·5	52 mm	×10·5 to ×60	21·0 to 3·7	×21 to ×120	11·6 to 2·0
×2	36 mm	×14 to ×80	15·6 to 2·8	×28 to ×160	8·7 to 1·5

All items on this page normally available from stock.

Olympus OBJECTIVES for Biological Microscopes

All objectives listed below are suitable for all *Olympus* microscopes except those requiring special objectives which are then listed under accessories for individual models.

All objectives are corrected for chromatic aberration and are parfocal, interchangeable and fluoride coated for maximum contrast and resolution.

For explanation of Lens Code see page 499.

No.	Type	Individual magnification	Numerical aperture	Focal length mm	Working distance mm	N.A. Condenser	Remarks	Code	Each	
***ML-500**	**Normal** Dry system	×4	0·10	29·2	35·0	1·25		N	**£3. 5. 0.**	*m*
		×10	0·25	15·8	5·6	1·25		N	**£4. 0. 0.**	*m*
		×20	0·40	8·1	1·55	1·25		N	**£6. 0. 0.**	*m*
		×40	0·65	4·4	0·56	1·25		N	**£7.15. 0.**	*m*
		×60	0·80	2·8	0·26	1·25		N	**£8.15. 0.**	*m*
***ML-504**	**Iris Diaphragm** Oil immersion	×100	1·30	1·8	0·14	Dark field condenser	For dark field work	N.I	**£19.10. 0.**	*m*
***ML-506**	**Spring Mounted** Dry system	×40	0·65	4·4	0·56	1·25	Avoids slide breakage	N.S	**£10.15. 0.**	*m*
	Oil immersion	×100	1·30	1·8	0·14	1·25	Avoids slide breakage	S	**£17.10. 0.**	*m*
***ML-530**	**Plan** Dry system	×1·3 (see Note 2)	0·03	40·3	38·68	0·22	No spherical aberration	Pl	**£11.15. 0.**	*m*
		×2 (see Note 2)	0·05	44·1	52·64	0·22	,,	Pl	**£12.15. 0.**	*m*
		×4	0·10	31·3	5·95	1·25	,,	Pl	**£12.15. 0.**	*m*
		×10	0·25	14·3	1·19	1·25	,,	Pl	**£14.15. 0.**	*m*
		×20	0·40	8·1	0·78	1·25	,,	Pl	**£19.10. 0.**	*m*
		×40	0·63	4·3	0·24	1·25	,, ,, Spring mounted	Pl.S	**£27.10. 0.**	*m*
	Oil immersion	×100	1·25	1·7	0·17	1·25	,,	Pl.S	**£67.10. 0.**	*m*
***ML-550**	**Semi-apochromatic** (Fluorite) Dry system	×40	0·77	4·4	0·49	1·25 or 1·40		Fl	**£19.10. 0.**	*m*
	Oil immersion (See Note 1)	×100	1·30	1·7	0·11	Dark field condenser	with iris diaphragm	Fl.I	**£36. 5. 0.**	*m*

NOTE 1: Semi-apochromatic objectives (fluorite) are highly corrected for colour aberration; the amount of the aberration $<\frac{1}{10}\lambda$ for every colour. They are very suitable for taking colour photographs.

NOTE 2: Low power objectives ML-530 ×1·3 and ×2 should be used with special condenser ML-720 which has a N.A. of 0·22.

All items on this page normally available from stock.

Olympus EYEPIECES for Biological Microscopes

All eyepieces listed in the table below are suitable for all *Olympus* microscopes except those requiring special eyepieces which are then listed under accessories for individual models.

All eyepieces are hard coated for high transmission and quality definition.

For explanation of Lens Code see page 499.

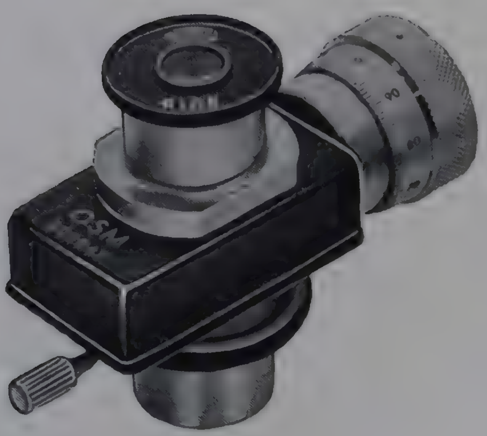
No.	Type	Magnification	Focal length mm	Field No.	Code	Remarks	Each	
	Single eyepieces			(See note below)				
*ML-600	Huygenian	×5	50	21	H	Especially effective with low power objectives	£2. 0. 0.	m
		×7	36	18	H		£2. 0. 0.	m
		×10	25	13	H		£2. 0. 0.	m
*ML-610	Compensation	×5	50	18·6	P	Compensate for chromatic aberration distortion of objective	£4. 0. 0.	m
		×7	36	18	P		£4. 0. 0.	m
		×10	25	13	P		£4. 0. 0.	m
		×15	16·7	9·5	P		£4. 0. 0.	m
		×20	12·5	7·5	K	For use with high power or fluorite objectives	£5. 0. 0.	m
*ML-630	Wide field	×10	25	13	WF	Provide large flat field of view	£5. 0. 0.	m
		×15	16·7	9·5	WF		£5. 0. 0.	m
*ML-634	For phototube	×7	36	18	P		£4. 0. 0.	m
		×10	25	13	P		£4. 0. 0.	m
		×15	16·7	9·5	P		£4. 0. 0.	m
	Binocular eyepieces						Pair	
*ML-640	Compensation	×7	36	18	BiP	Supplied in pairs	£10. 0. 0.	m
		×10	25	13	BiP		£10. 0. 0.	m
		×15	16·7	9·5	BiP		£10. 0. 0.	m
		×20	12·5	7·5	BiK		£11. 15. 0.	m
*ML-642	Wide field	×10	25	13	BiWF	Supplied in pairs	£11. 15. 0.	m
		×15	16·7	12	BiWF		£11. 15. 0.	m

No.	Type	Magnification	Focal length mm	Field No.	Code	Pair	
*ML-650	**For Stereoscopic Microscopes** Wide field	×10	25	20	G	£9. 5. 0.	m
		×15	16·7	13	G	£9. 5. 0.	m
		×20	12·5	10	G	£9. 5. 0.	m

NOTE: Field No. is the product of the magnifying power of the objective used and the diameter of the field of view. Thus Field No. is proportional to the field of view and is useful, therefore, as a guide.

All items on this page normally available from stock.

Olympus
MICROMETER EYEPIECES


ML-660

***ML-660**

MICROMETER EYEPIECE, *Olympus* **Model OSM,** magnification ×10. Can be inserted into the eyepiece sleeve on a monocular, binocular or trinocular head, after removal of the auxiliary lens. An accurate measurement of 0·0001 mm is possible when using an ×100 objective. Each **£23. 10. 0.** *m*

***ML-670**

COMPENSATION MICROMETER EYEPIECE, *Olympus*, 10 mm/100. Magnification ×7. Focal length 36 mm... ... ... Each **£6. 17. 6.** *m*

NOTE: Details of suitable 19 mm dia. graticules—see EYPIECE GRATICULES MP-710 et seq. in List No. sequence.

Olympus CONDENSERS

Five types of *Olympus* condenser are available to satisfy varied requirements. All have an external diameter of 36·8 mm.

***ML-700**

CONDENSER, *Olympus*, **Abbé type,** N.A. 1·25, with variable iris diaphragm ... ... Each **£8. 17. 6.** *m*

***ML-702**

CONDENSER, *Olympus*, **Abbé type,** N.A. 1·40, with variable iris diaphragm ... ... Each **£10. 15. 0.** *m*

***ML-710**

CONDENSER, *Olympus*, **swing-out,** N.A. 0·9–0·25, with variable iris diaphragm ... Each **£12. 15. 0.** *m*

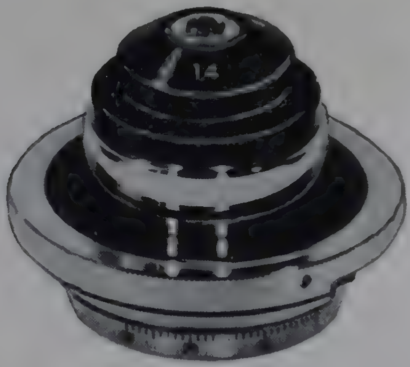
***ML-720**

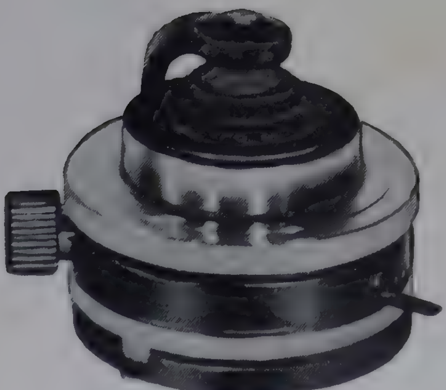
CONDENSER, *Olympus*, N.A. 0·22 for use only with ×1·3 and ×2 achromatic objectives. Each **£5. 17. 6.** *m*

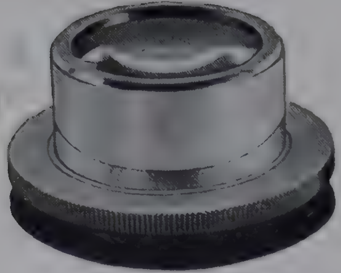
***ML-730**

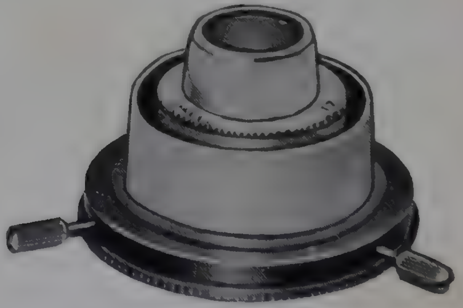
CONDENSER, dark-field, *Olympus*, **Model DC,** for observation of Brownian movement of colloids, etc. Must be used with objective ML-504 for oil immersion applications ... ... Each **£11. 15. 0.** *m*

ML-700


ML-702


ML-710


ML-720


ML-730

All items on this page normally available from stock.

Olympus ILLUMINATORS

***ML-800**

ILLUMINATOR, Substage, *Olympus* **Model LSK-IV,** for microscopes GB & ST. With 20W lamp; requires no transformer. For 240V a.c. or d.c. supplies. Each **£4. 0. 0.** *m*

***ML-801** **Replacement lamp, 20W** ... ... Each £0. 7. 0. *m*

***ML-802**

ILLUMINATOR, Universal, *Olympus* **Model LSD,** a mains powered, external illuminator with fully adjustable light intensity and focusing. For use with mirror illuminators and suitable for Köhler illumination. Includes adjustable output transformer in ventilated case fitted with voltmeter and pilot lamp. For 240V a.c. single phase supplies ... ... Each **£25. 17. 6.** *m*

***ML-803** **Replacement lamp, 30W** ... ... Each £0. 7. 0. *m*

***ML-804**

EPI-ILLUMINATOR, *Olympus* **Model LSG-II,** for stereoscopic microscopes. With light focusing facility and adjustable output transformer in ventilated case fitted with pilot lamp. For 240V a.c. single phase supplies. Each **£21. 10. 0.** *m*

***ML-805** **Replacement lamp, 12W** ... ... Each £0. 7. 0. *m*

***ML-806**

ILLUMINATOR, *Olympus* **Model LSF,** with fluorescent tube for stereoscopic microscopes. Includes choke for 240V a.c. single phase supplies... Each **£37. 10. 0.** *m*

***ML-807** **Replacement fluorescent tube** ... Each £3. 0. 0. *m*

***ML-810**

ILLUMINATOR, *Olympus* **Model HLS-II.** A bright fluorescent light source for fluorescent microscopy. Comprises a 250W high pressure mercury discharge tube, five excitation filters and four pairs of eyepiece filters. For 240V a.c. single phase supplies ... Each **£350. 0. 0.** *m*

REPLACEMENT PART

***ML-812** **Discharge tube,** 250W ... ... Each £29. 10. 0. *m*

ACCESSORIES

***ML-814** **Tank,** for copper sulphate solution. Each £8. 0. 0. *m*

***ML-815** **Condenser,** dark field, for low magnification. Each £19. 10. 0. *m*

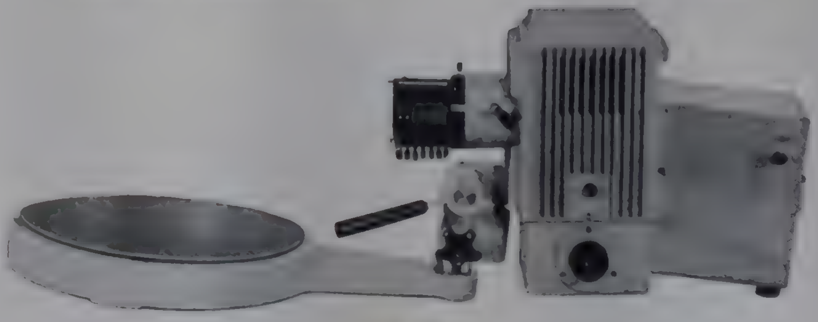
***ML-816** **Tube filter** assembly with eight filters. Each £98. 0. 0. *m*

ML-800

ML-802
without transformer

ML-804
without transformer

ML-806
without choke


ML-810

Olympus TRANSFORMER

***ML-818**

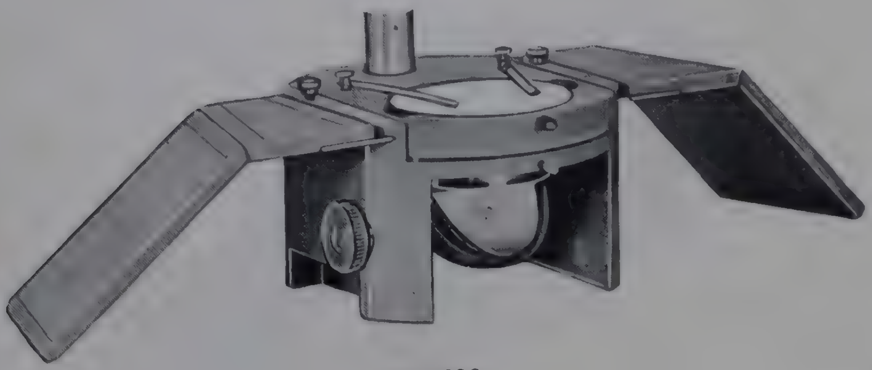
TRANSFORMER, *Olympus* **Model TE-II,** variable output, for use with microscopes series EH and FH. Mounted in ventilated case fitted with voltmeter and pilot lamp. For 240V single phase supplies, maximum output 6V 5A... ... ... Each **£15. 0. 0.** *m*

ML-818

When ordering electrical accessories please state voltage and nature of supply.

All items on this page normally available from stock.

Olympus
STANDS FOR STEREOSCOPIC MICROSCOPES



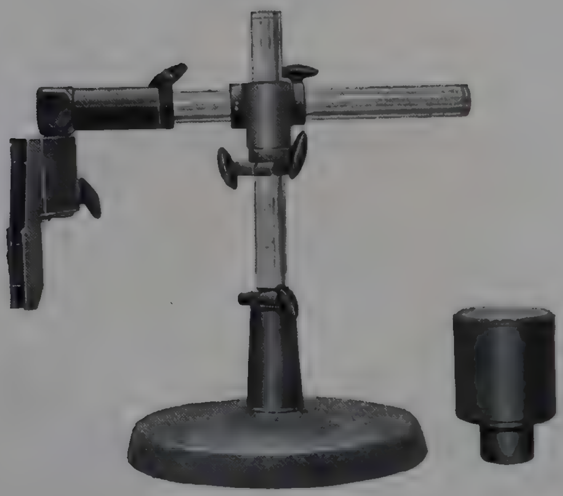
ML-820

***ML-820**
TRANS-ILLUMINATING SUBSTAGE BASE, *Olympus*, with fork-mounted adjustable mirror. A 20W illuminator is incorporated in the back of the stand. Complete with inclined arm rests. For 240V a.c. or d.c. supplies ... ... Each **£17. 5. 0.** *m*

***ML-821 Replacement lamp, 20W** ... Each **£0. 7. 0.** *m*

When ordering please state voltage and nature of supply.

***ML-822**
STAND, Universal, Model VS-IV, for examining large objects with any *Olympus* stereoscopic microscope. Each **£27.15. 0.** *m*



ML-822

Olympus
PHASE CONTRAST OUTFITS

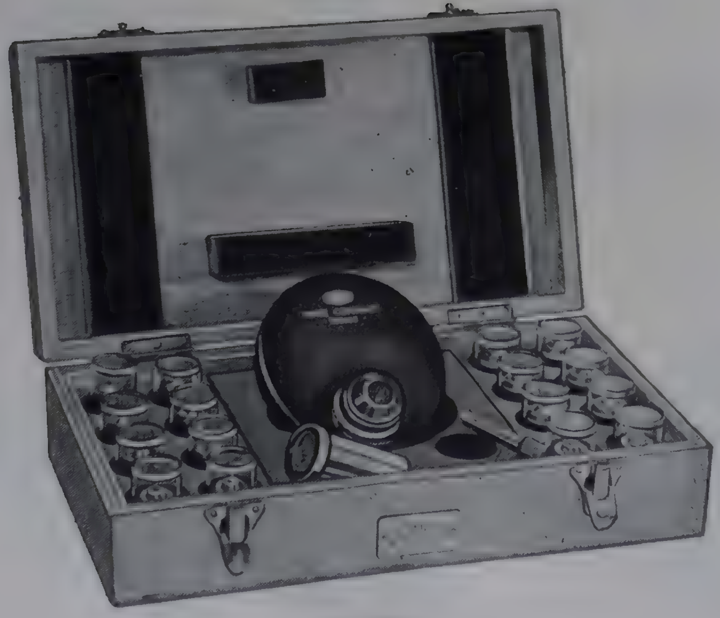
Phase contrast equipment is used for the study of transparent specimens, such as living cells or materials which are not easily stained.

Objectives for phase contrast

Phase	Absorption	Magnification
Positive	Low	×10, ×20, ×40, ×100
	Low Low	×10, ×20, ×40, ×100
Negative	High	×10, ×20, ×40, ×100
	Medium	×10, ×20, ×40, ×100

Model	Contents
P A	four combinations of objectives (16 pieces) one turret condenser, one centring telescope, one green filter.
P B	one combination of objective (4 pieces), one turret condenser, one centring telescope, one green filter.

Each set is complete in a hardwood case.



ML-850

***ML-850**
PHASE CONTRAST EQUIPMENT, *Olympus* **Model PA,** including all 4 combinations of phase objectives (16 pieces) ... ... Each **£220. 0. 0.** *m*

***ML-860**
PHASE CONTRAST EQUIPMENT, *Olympus* **Model PB,** including one combination of phase objectives (4 pieces), positive phase, low absorption. Each **£74.10. 0.** *m*

***ML-861**
PHASE CONTRAST EQUIPMENT, *Olympus* **Model PB,** including one combination of objectives (4 pieces), negative phase, high absorption. Each **£74.10. 0.** *m*

***ML-863**
PHASE CONTRAST EQUIPMENT, *Olympus* **Model PB,** including one combination of objectives (4 pieces), negative phase, medium absorption. Each **£74.10. 0.** *m*

All items on this page normally available from stock.

Olympus
PHOTOMICROGRAPHIC OUTFIT

- **Shock-proof shutter prevents vibration and ensures clear pictures.**
- **Specimen may be observed while photographing.**
- **Includes 35 mm film camera.**
- **Suitable for all eyepieces except ×5.**
- **Facility for attaching exposure meter.**
- **Can take whole field of view with total magnification of film = 1/3 × total magnification of microscope.**

ML-900

***ML-900**

PHOTOMICROGRAPHIC OUTFIT, *Olympus* **Model PM6.** The camera is fitted with automatic film stop and cable release. Shutter speeds range from 1 to 1/50 sec and B. The adapter fits all standard biological microscopes ... ... Each **£52. 10. 0.** *m*

***ML-940**

EXPOSURE METER, *Olympus* **Model EMM-V,** direct reading, with cadmium sulphide cell, measuring a wide range of light intensity independent of colour. The luminous intensity of light incident on the window of a photographic device, or at the plane where a photo sensitive plate or film should be placed, is measured.
Each **£88. 0. 0.** *m*

OLYMPUS EMM-V

ML-940

Olympus
MICROPROJECTION SCREEN

For group viewing and optical comparison.

- **Fits any microscope with vertical tube or trinocular head.**
- **Instantly attached or removed using the clamp screw.**
- **Facility for inserting eyepieces.**
- **The projected image can be directly traced on the ground glass screen after removing the hood.**

SCREEN

85 mm diameter ground glass inclined at 10° to the vertical plane.

MAGNIFICATION

Magnification of projected image is × ⅔ magnification of the microscope.

ILLUMINATION

An efficient light source must be used.

ML-950

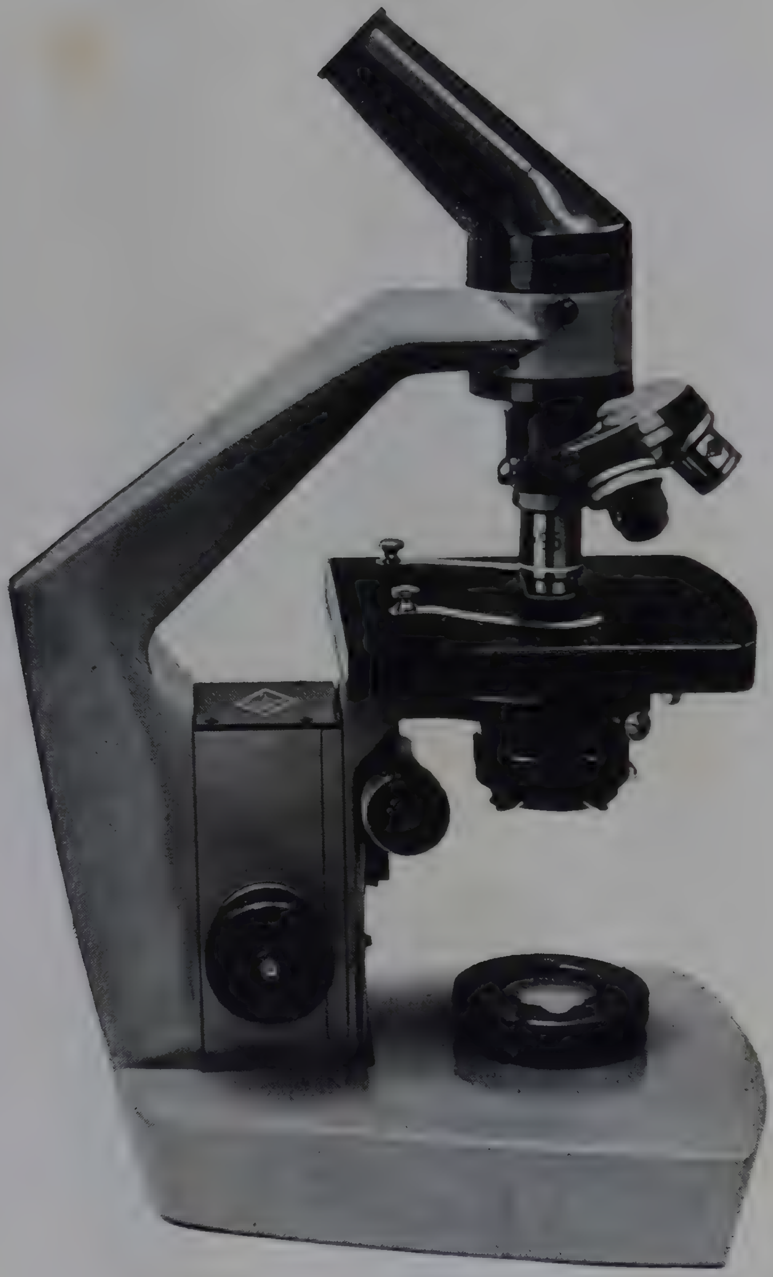
***ML-950**

MICROPROJECTION SCREEN, *Olympus* **Model MPS,** as specification, fitted with attachable metal hood.
Each **£25. 0. 0.** *m*

All items on this page normally available from stock.

PRIOR SOLITAIRE MONOCULAR MICROSCOPES

A range of modern microscopes selected as being suitable for use in school and college biological laboratories.



MM-156

- Inclined monocular head
- Triple nosepiece
- Fixed square stage with clips
- Substage focusing
- Uniform subject illumination from built-in mains lamp
- Components fully interchangeable between models
- Graduated mechanical stage available

OBJECTIVES

Magnification	Focal length mm	Numerical Aperture	Working distance mm
×5	24	0·12	27·0
×10	16	0·18	16·5
×42	4	0·70	0·6
×95	2	1·25	oil immersion

The ×42 and ×95 objectives are protected by spring loaded mounts.

MM-150

MICROSCOPE, *Prior Solitaire,* as specification with inclined monocular head, ×10 Huygenian eyepiece, ×10 and ×42 objectives in revolving nosepiece, Abbé condenser in adjustable sleeve substage mount, 25W 220/240V lamp and collecting lens and plastics dust cover.
Each **£54. 0. 0.** f

MM-152

MICROSCOPE, *Prior Solitaire,* as specification with inclined monocular head, ×6 and ×10 Huygenian eyepieces, ×10 and ×42 objectives in revolving nosepiece, Abbé condenser in adjustable rack and pinion substage mount, 25W 220/240V lamp and collecting lens and plastics dust cover ... ... Each **£59. 14. 0.** f

MM-154

MICROSCOPE, *Prior Solitaire,* as MM-152 above with additional ×95 oil immersion objective.
Each **£71. 14. 0.** f

MM-156

MICROSCOPE, *Prior Solitaire,* as specification, with inclined monocular head, ×6 and ×10 Huygenian eyepieces, ×5, ×10 and ×42 objectives in revolving nosepiece, modified Abbé condenser with swing out top lens for wide field illumination, adjustable rack and pinion condenser substage mount, 25W 220/240V lamp and collecting lens and plastics dust cover.
Each **£67. 10. 0.** f

Illuminating lamps for other voltages available.

When ordering please state voltage and nature of supply.

REPLACEMENT PART

MM-160 **Lamp bulb,** 25W 220/240V supplies.
Pack of 3 £0. 13. 6. f

ACCESSORIES

MM-162 **Graduated mechanical stage,** horizontal movement 65 mm, vertical movement 25 mm, vernier reading to 0·1 mm ... ... Each £14 0. 0. f

MM-164 **Mirror assembly** for use in place of collecting lens.
Each £2 10 0. f

MM-166 **Cabinet,** wood for transporting Solitaire monocular microscopes ... ... Each. £3. 15. 0. f

For immersion oil see HJ-520 in List No. sequence.

PRIOR SOLITAIRE BINOCULAR MICROSCOPES

- **Inclined binocular head**
- **Triple nosepiece**
- **Graduated mechanical stage**
- **Centring substage condenser**
- **Uniform subject illumination from built-in mains lamp**
- **Achromatic and dark ground condensers, Köhler illumination and upright eyetube available**

OBJECTIVES

Magnification	Focal length mm	Numerical aperture	Working distance mm
×10	16	0·28	5·5
×42	4	0·70	0·6
×105	1·8	1·30	oil immersion

The ×42 and ×105 objectives are protected by spring loaded mounts.

MM-170

MICROSCOPE, *Prior Solitaire,* as specification, with inclined binocular head, paired ×6 and ×10 Huygenian eyepieces, ×10 and ×42 objectives in quadruple nosepiece, built-in graduated mechanical stage, Abbé condenser in adjustable rack and pinion substage mount with centring device, 25W 220/240V lamp and collecting lens and plastics dust cover. In fitted wood cabinet.

Each **£133. 12. 0.** *f*

MM-172

MICROSCOPE, *Prior Solitaire,* as MM-170 but with Aplanatic condenser and ×105 oil immersion lens.

Each **£153. 18. 0.** *f*

Illuminating lamps for other voltages available.

When ordering please state voltage and nature of supply.

REPLACEMENT PART

MM-160 **Lamp bulb,** 25W 220/240V supplies. For price see entry in List No. sequence.

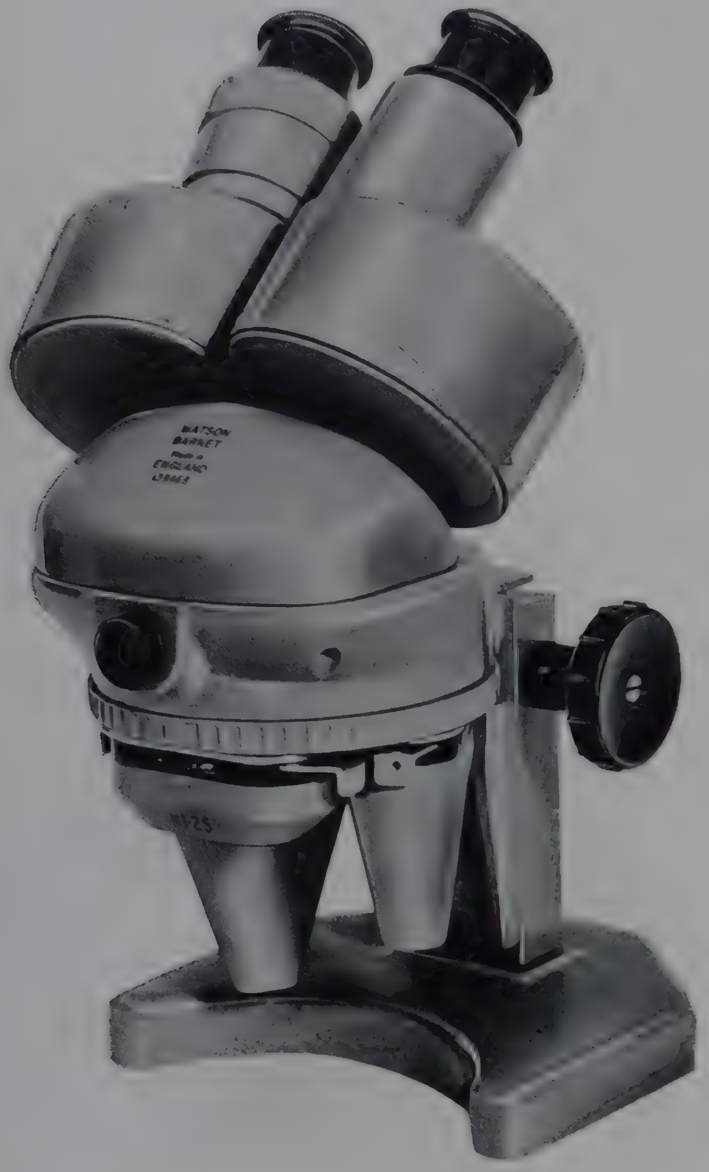
ACCESSORIES

MM-180	**Achromatic condenser**	Each **£15. 0. 0.**	*f*
MM-182	**Dark ground condenser** with funnel stop.	Each **£19. 10. 0.**	*f*
MM-184	**Köhler illuminator** with transformer for 220/240V supplies	Each **£31. 18. 0.**	*f*
MM-186	**Upright monocular tube** for photography.	Each **£3. 10. 0.**	*f*
MM-164	**Mirror assembly** for use in place of collecting lens. For price see entry in List No. sequence.		

For immersion oil see HJ-520 in List No. sequence.

MM-170

WATSON STEREOSCOPIC MICROSCOPES



MP-300

A range of stereomicroscopes selected as being suitable for applications in medicine, education and industry.

- **Eyepieces inclined at 45°**
- **Adjustment for inter-pupillary distance**
- **Independent focusing compensates for differences between the observer's eyes**

BINOCULAR OPTICAL UNIT

The prism boxes have a lateral range of movement from 56 mm to 87 mm for adjustment to inter-pupillary distance. Internally housed, dust-proof gearing links the two boxes, so that when one is moved the other follows automatically. Independent focusing of the right eyepiece compensates for any difference of vision between the eyes of the observer.

NOSEPIECES

Rotating which accepts up to three objectives. Fixed which accepts one objective only.

FOCUSING

By precision rack and pinion. Large control knobs are provided on both sides of the limb.

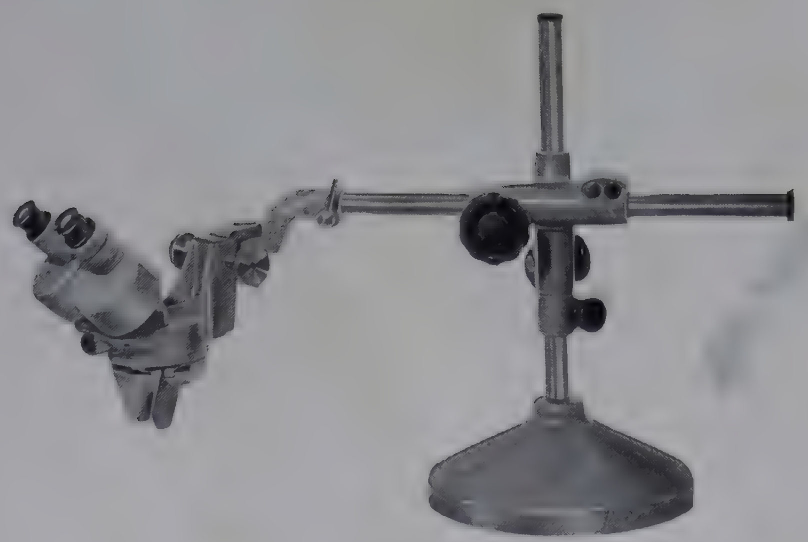
Objectives	Eyepieces	Magnification	Field of view mm	Working distance mm
×1·25	×10	12·5	19·0	85
×2·5	×10	25	9·2	74
×5·0	×10	50	4·6	42

MP-300

STEREOMICROSCOPE, *Watson*, **Model 850** with inclined binocular head, matched pair of ×10 eyepieces, fixed nosepiece with matched pair of ×1·25 objectives, and heavy cast standard foot. With plastics dust cover. Each **£68. 0. 0.** *f*

MP-305

STEREOMICROSCOPE, *Watson*, **Model 1050** with inclined binocular head, matched pair of ×10 eyepieces, triple rotating nosepiece with matched pairs of ×1·25, ×2·5 and ×5 objectives and heavy cast foot with reversible black and white stage plate and slide clips. With plastics dust cover ... ... Each **£94. 10. 0.** *f*



MP-310

MP-310

STEREOMICROSCOPE, *Watson*, **long arm model** with inclined binocular head, matched pair of ×10 eyepieces, triple rotating nosepieces with matched pairs of ×1·25, ×2·5 and ×5 objectives and heavily weighted rackwork long arm stand. With plastics dust cover. Each **£125. 0. 0.** *f*

WATSON 5 : 1 ZOOM STEREOSCOPIC MICROSCOPE

- **Continuous change of magnification without change of objectives**
- **Working distance remains constant for each zoom run**
- **High image quality maintained throughout zoom run**
- **Convenient location of controls for operator comfort**

Wide angle eyepiece	Magnification range	Field of view mm	Working distance mm
×10	×10 to ×50	20 to 4	78

MP-360
ZOOM STEREOMICROSCOPE, *Watson* **Model 521** with reversible inclined eyepiece unit, matched pair of **×10 wide angle eyepieces,** stand with focusing controls, reversible black and white stage plate and stage clips. With plastics dust cover, in fitted wooden cabinet.
Each **£199. 10. 0.** *f*

MP-360

MICROMANIPULATORS

For use in histology, bacteriology, physiology, crystallography, electronic microcircuitry and other applications where precise controlled movement of tools and probes is required. Vertical movement is by 'coarse' rack and pinion with vernier reading to 0·1 mm and a fine control knob marked with 20 equal subdivisions. One revolution of the 'fine' control produces a vertical movement of 0·127 mm. Horizontal movement is by rack and pinion for longitudinal travel and pinion and worm for transverse travel. Each movement has a vernier scale reading to 0·1 mm. The head drilled to accept and clamp three 6·3 mm diameter probes mutually at right angles is fitted to the end of the transverse movement. Accessories available include a micro drive which permits a 13 mm movement and a ball and socket joint which allows probes to be set at any angle required.

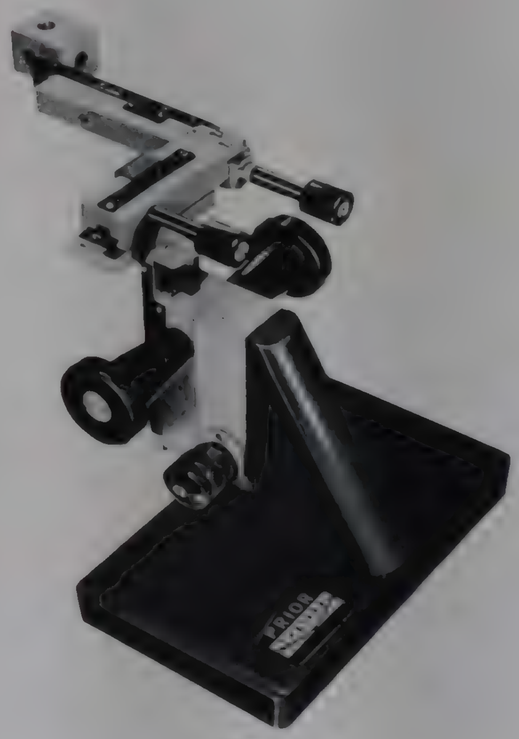
MP-600
MICROMANIPULATOR, *Prior*, as specification, with standard cast base and vertical, longitudinal and transverse drives ... ... Each **£35. 0. 0.** *fS*

MP-602
MICROMANIPULATOR, *Prior* as MP-600 but with tilt movement which permits the transverse movement to be inclined through 180° and clamped at any angle.
Each **£37. 10. 0.** *f*

MP-610
MICROMANIPULATOR, *Prior* as MP-600 but with magnetic base controlled by a hold/release button, for machine or surface plate mounting.
Each **£40. 15. 0.** *f*

MP-612
MICROMANIPULATOR, *Prior* as MP-610 but with tilt movement which permits the transverse movement to be inclined through 180° and clamped at any angle.
Each **£43. 5. 0.** *f*

NOTE: When ordering MP-600, MP-602, MP-610 and MP-612 right hand model will be supplied unless a left hand model is specified.



MP-600

ACCESSORIES

MP-620 **Micro-drive** for 13 mm movement in a single direction, with micrometer reading to 0·01 mm. Fits standard head and accepts standard needle holders.
Each **£6. 10. 0.** *f*

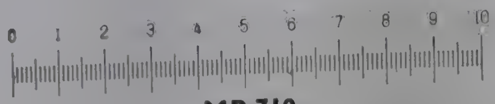
MP-622 **Ball and socket joint,** permits needle holder to be set at any angle. Fits standard head ... Each **£1. 10. 0.** *f*

MP-624 **Needle holder** with 6·3 mm dia. shaft to fit standard head and with screw chuck to grip probes from 0 to 1 mm o.d. ... ... Each **£0. 10. 0.** *f*

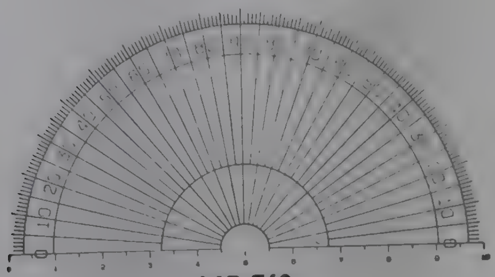
MP-626 **Needle holder** as MP-624 but to grip probes from 0·75 to 1·5 mm o.d.... ... ... Each **£0. 10. 0.** *f*

MP-628 **Needle holder** as MP-624 but to grip probes from 1·25 to 3·0 mm o.d.... ... ... Each **£0. 10. 0.** *f*

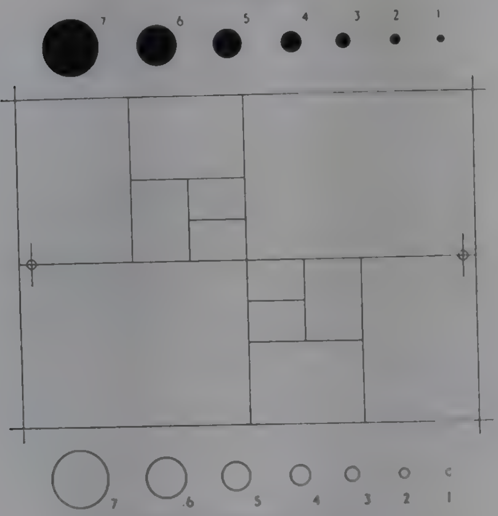
Items on this page coded *S* normally available from stock.



MP-710

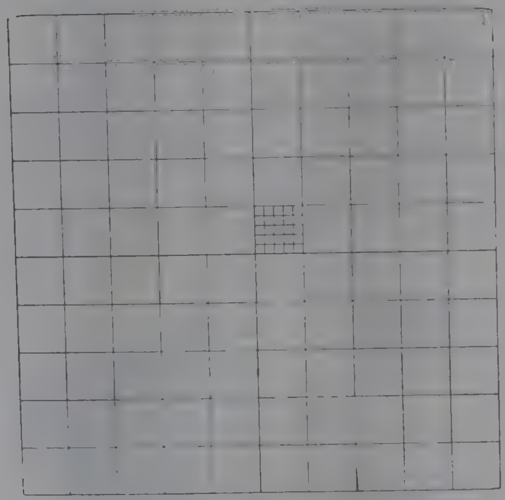


MP-760

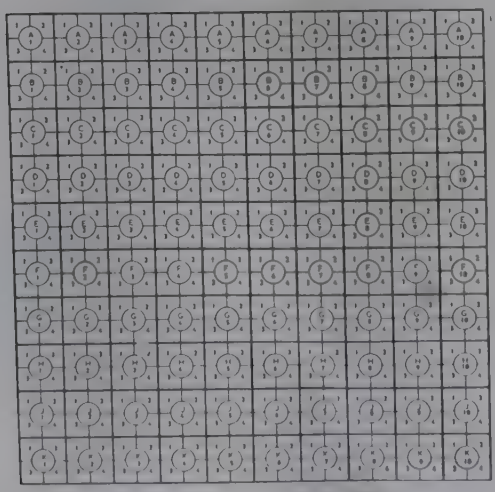


GRID LENGTH 4·5 mm

MP-763



MP-766



Section of MP-780

EYEPIECE GRATICULES

Eyepiece graticules mounted on optical glass disks 19 mm dia. to fit *Olympus* and most other standard microscope eyepieces. The scales and rulings are in opaque black on a transparent background.

LINEAR RULINGS

List No.	Type of scale	Length	Subdivisions	Each	
MP-710	Horizontal	10 mm	100 µm	28/–	*m*
MP-712	"	2 mm	20 µm	34/–	*m*
MP-715	Horizontal with crossline	10 mm	100 µm	28/–	*m*
MP-725	Vertical/Horizontal	10 mm	100 µm	30/–	*m*

MP-745

EYEPIECE GRATICULE. With one square, 1 cm side divided into 100 squares of 1 mm numbered and lettered along two edges ... ... Each **£1. 8. 0.** *m*

MP-760

EYEPIECE GRATICULE, half-circle protractor, graduated 0°–90°–0°, on base of 10 mm subdivided in 0·5 mm ... ... Each **£1. 14. 0.** *m*

MP-763

EYEPIECE GRATICULE, to BS 3625 for determination of the particle size of powders ... Each **£4. 0. 0.** *m*

MP-766

EYEPIECE GRATICULE, Whipple, for counting bacteria and for calibration... ... Each **£1. 8. 0.** *m*

STAGE GRATICULES

Graticules on glass disks mounted in 75×25 mm black anodised slides and supplied in plastics cases.

List No.	Length	Subdivisions	Each	
MP-770	10 mm	100 µm	35/–	*m*
MP-772	1 mm	10 µm	39/–	*m*
MP-773	100 µm	2 µm	80/–	*m*
MP-774	{ 0·1 in. 2 mm	{ 0·0005 in. 10 µm	39/–	*m*

MP-780

STAGE GRATICULE, England Finder, a 75×25 mm glass slide marked over the whole top surface in such a way that a reference position can be obtained by direct observation. The slide is marked with a square grid at 1 mm intervals. Each square contains a centre ring bearing a reference letter and number; the remainder of the square being subdivided into four segments numbered 1 to 4. All three locating edges are marked with arrow heads and the slide is marked with a positioning label. Complete with instructions ... Each **£3. 3. 0.** *m*

MP-785

MICROLITRE COUNTING CELL, Sedgewick Rafter. A transparent plastics slide with central cell 50×20×1 mm ruled in 1 mm squares, with cover glass to contain 1 ml of liquid. For use in water analysis, particle analysis, etc. Can be used with MP-766. Each **£2. 2. 0.** *m*

All items on this page normally available from stock.

MICROSCOPE ACCESSORIES

MP-825

MICROSCOPE LAMP, *Prior,* comprising lamp house for 40W or 60W mains bulb with end cap having a 38 mm hole and holder for 51 mm square filter. The lamp is mounted adjustably on a stand 33 cm high with heavy base. The end cap and filter are removable to provide bench illumination for dissecting, etc. Complete with daylight blue filter and 60W bulb. For 220/240V supplies.
Each **£2. 12. 0.** *f*

MP-835

MICROSCOPE LAMP, *Watson.* An inexpensive but versatile lamp of robust construction. The lamp housing will accommodate a normal mains lamp bulb of 40W or 60W and is provided with cooling vents arranged so that stray light is directed away from the microscope. The housing, fitted with adjustable iris diaphragm and spring loaded filter holder, is mounted adjustably on a heavy tripod base. Complete with 60W bulb. For 220/240V supplies ... ... Each **£4. 10. 0.** *f*

MP-825

MP-835

MP-850

MICROSCOPE LAMP, HIGH INTENSITY, *Prior,* for transmitted, Köhler or top illumination. The 6V 30W bulb is fitted in a centring mount at the rear of the lamphouse. A lever controlled iris diaphragm is interposed between the lamp and the focusing condenser assembly the front of which has slots for three 51 × 51 mm filters. The lamphouse is clamped to the stand rod with an adjustable bosshead and the heavy stand base houses the mains transformer. For 220/240V a.c. single phase supplies.
Each **£24. 0. 0.** *f*

REPLACEMENT PART

MP-852 **Spare bulb, 6V, 30W** ... ... Each **£0. 16. 6.** *f*

MP-850

MP-890

DUST COVER, PVC, for microscopes 40 cm maximum height and 30 cm maximum width. Each **£0. 7. 0.** c

For **slides, cover glasses, handling forceps** and **slide storage cabinets** see HISTOLOGY.

SYSTEME INTERNATIONAL D'UNITES, SI UNITS

In May 1966 the British Government expressed their official view, that British industries should adopt metric units, sector by sector until the metric system becomes the primary system of weights and measures in the United Kingdom. At the same time the British Standards Institution (BSI) was asked to give the lead by the speedy metrication of British Standards and to plan the changeover programmes in consultation with each industry.

The initial step was the adoption by the BSI of the SI units, which had been internationally accepted by the Conference General des Poids et Mesures in 1960, approved by the International Organisation for Standardisation (ISO) and published in a British Standard (BS 3763) * in 1964. Since that date, the BSI has issued a number of other publications relating to particular aspects and applications of the system including PD 5686 * in 1967 'The use of SI units', also a useful conversion slide rule.

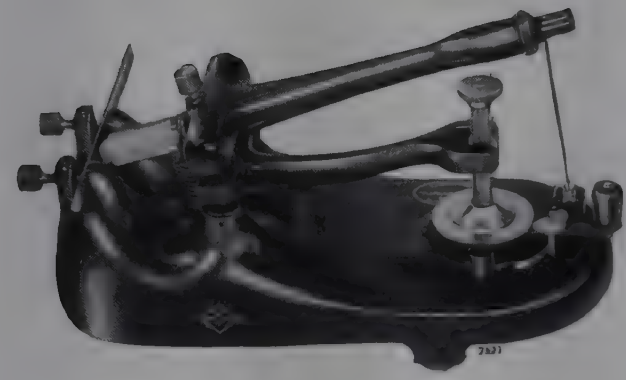
The SI system is a coherent system of units in which the product of any two unit quantities is the unit of the resultant quantity. There are six basic units: length, mass, time, electric current, absolute temperature and luminous intensity. These and the derived units as well as their multiples and sub-multiples have all been defined and assigned symbols. Many are familiar already, particularly those in regular use in the pure sciences and in many metric countries. All will become better known within the next few years.

In this catalogue SI units have been used wherever practicable. We have only retained Imperial units in those cases where conversion might be misleading or inappropriate or because the item is used in a field where the metric equivalent value is not yet generally recognised. We have deliberately avoided converting every unit of British measure into its approximate metric equivalent. As metrication proceeds it is our intention to keep pace with the change until eventually the only units used will be SI units.

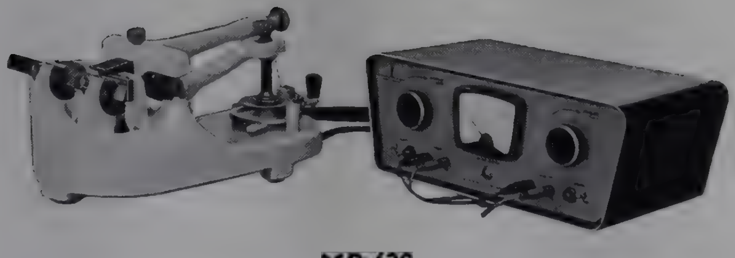
* The above publications are available from The British Standards Institution, Newton House, 101 Pentonville Road, London N.1.

All items on this page normally available from stock.

MICROTOMES



MR-600



MR-620

STANDARD PATTERN ROCKING MICROTOME

For cutting paraffin embedded specimens of comparatively soft tissues and for use as a freezing microtome with the necessary attachment. It will cut long ribbons of sections from specimens not exceeding 20 mm dia. and using the accessory wood blocks, sections of specimens up to 20 × 25 mm may be cut. The thickness of the sections may be varied between 2 and 24 µm.

The strict application of geometric design principles and robust construction ensure unvarying accuracy in the sections obtained. Simplicity of operating makes it an ideal instrument for students' use and routine work. Complete with simple object holder, orientating object holder and knife.

MR-600
MICROTOME, ROCKING, *Cambridge*, as specification, for small sections ... ... Each **£45. 0. 0.** *fS*

REPLACEMENT PART

MR-601	**Knife**	Each **£2.11. 6.**	*fS*

ACCESSORIES

MR-602	**Freezing attachment**	Each **£21. 5. 0.**	*f*
MR-604	**Object holder,** for wood blocks.	Each **£0.18. 0.**	*fS*
MR-606	**Blocks, hardwood,** with 22 × 32 mm mounting face.		

Thickness	16	22 mm	
Dozen packs	**57/6**	**52/6**	
Pack of 10	**6/–**	**5/8**	*fS*

THERMOELECTRIC ROCKING MICROTOME

An adaptation of the standard pattern rocking microtome MR-600 in which *Frigistor* cooling modules are used to cool both the microtome stage and the knife, so dispensing with the need for CO_2 gas, solid CO_2 or the use of conventional refrigeration systems. Stage and knife temperatures can be varied independently in order that optimum sectioning temperatures may be obtained and held indefinitely.

The apparatus is supplied as a microtome with integral knife and stage cooling modules, a power unit with module temperature controls and current indicator, together with a harness of electrical connectors and water piping. **A small flow of cold water is required to maintain accurate sectioning temperatures.**

The knife can be cooled down to −20 to −25°C (depending upon ambient temperature) in 3–4 minutes; the stage can be cooled similarly to −25 to −30°C in about 1 minute.

MR-620
MICROTOME, ROCKING, *Cambridge-Frigistor*, with freezing 20 mm object holder, knife holder with cooling modules, wedge knife and *Frigistor* power unit. For 240V 50 Hz single phase supplies only (power rating 150W approx.) ... ... Each **£194.13. 6.** *f*

When ordering please state voltage and nature of supply.

REPLACEMENT PART

MR-622	**Wedge knife,** Jung pattern ...	Each **£5. 0 0.**	*f*

ACCESSORIES

MR-624	**Knife-sharpening outfit** with hone, strop, oil and abrasives	Each **£5.15. 0.**	*f*
MR-626	**Knife back,** essential for stropping and sharpening knives	Each **£1.13. 6.**	*f*

Aerosol freezer suitable for cooling microtome knives see RJ-550 in List No. sequence.

Items on this page coded *S* normally available from stock.

MICROTOMES

(continued)

CAMBRIDGE ROTARY ROCKING MICROTOME

For cutting practically flat sections between 2 and 24 μm of specimens up to 38×50 mm. This microtome has a rotary drive with a smooth continuous action which cuts out automatically when the feed screw reaches the end of its travel thus avoiding damage. Specimens up to 25 mm thick may be accommodated on the wood block.

MR-660

CONSTRUCTION

The heavily webbed base supports the knife holder and all the moving parts which are enclosed by a dustproof, light metal cover. The specimen clamp takes wood blocks up to 38×50 mm but either the simple or orientating holder may be secured in the clamping device of the rocker arm. A safety device locks the rocker arm at the top of its stroke to facilitate safe changing of specimen holders. The mechanical drive is arranged so that on the return stroke the specimen does not rub against the knife.

MR-690

MR-660

MICROTOME, ROTARY ROCKING, *Cambridge*, as specification, with 17° knife for soft tissues and one dozen wood blocks ... ... Each **£145. 0. 0.** *f*

ACCESSORIES

MR-662	**Knife,** 22°, for hard tissues ...	Each £8. 15. 0.	*f*
MR-664	**Object holder,** for 45 mm specimen.	Each £7. 0. 0.	*f*
MR-665	**Object holder,** orientating, for 45 mm specimen.	Each £16. 0. 0.	*f*
MR-666	**Adapter,** for securing MR-664 and MR-665 in specimen clamp	Each £1. 5. 0.	*f*
MR-668	**Blocks,** hardwood, 16×38×50 mm. Dozen packs £3. 0. 0.	Pack of 10 £0. 6. 4.	*f*

MR-690

ULTRA-MICROTOME, *Cambridge*, **A. F. Huxley pattern,** for cutting ultra thin sections of biological tissues and metals for examination by electron microscopy. Sections can be cut in the range of thickness 10 mμ to 150 mμ (in increments of 5 mμ) and having an area up to 3×4 mm. The instrument is specifically designed to avoid errors from thermal expansion, vibration, friction and backlash. The knife holder is designed for use with glass knives, but can also be used with other types (e.g. diamond-tipped). Supplied with standard specimen holder, 3 collets to hold specimens 4·5, 7·5 and 7·75 mm dia., specimen embedding capsules, equipment for making glass knives, 6 liquid baths, fibre glass cover and various tools and sundries ... ... Each **£375. 0. 0.** *fN*

Illustrated brochure with full details available on application).

Gallenkamp MICROSCOPE SLIDE HOLDER

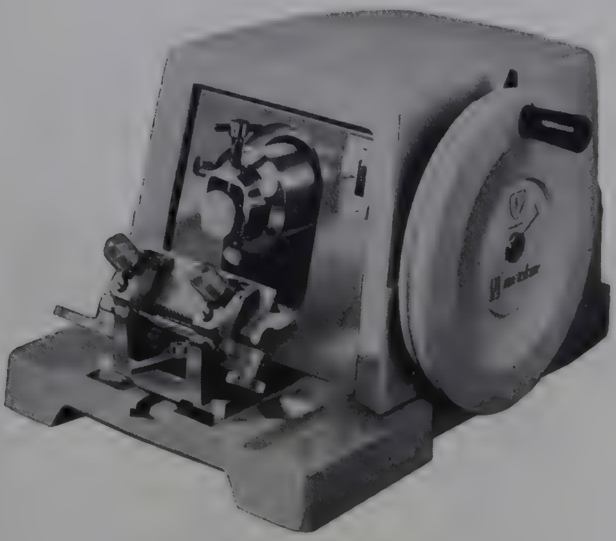
An aluminium holder to accommodate four 75×25 mm slides for storage in any standard filing cabinet taking 125×75 mm cards, see HJ-850.

Storage cabinet to take 200 of these holders in 2 drawers providing accommodation for 800 slides, see HJ-860.

These items will be found in List No. sequence under **HISTOLOGY.**

Items on this page normally available from stock except those coded *N.*

MICROTOMES


MR-720

MR-760

MR-780

***MR-720**

ROTARY MICROTOME, *Spencer*, for sections 1 to 50 microns. Feed settings are controlled by a single knurled knob and indicated on a graduated scale. The instrument is rigidly supported on a massive base with a hinged protective cover cast from sturdy, lightweight aluminium. When the cover is lowered, an outside crank engages the feed mechanism and is used to bring the feed screw to the starting position. The feed mechanism is independent of the vertical movement of the object block and has a 28 mm travel. A safety device disengages it from the drive when the limit is reached. The drive wheel has a simple locking device which holds it securely in a position where the specimen and knife are easily accessible for adjustment and cleaning. The 120 mm knife is of high quality fine grained tool steel and may be tilted over a 30° range indicated on a scale graduated in 2° increments. The knife is supplied in a case with knife back and detachable handle. The object block has a 5 cm traverse to permit the cutting of large serial sections, and an object clamp is supplied. This clamp, which accommodates specimens up to 32 × 27 mm, includes three object discs 22, 29 and 38 mm diameter ... ... Each **£340. 0. 0.** *f*

PRICE including DUTY.

***MR-760**

MICROTOME KNIFE SHARPENER, *Spencer*, **automatic.** The knife is stroked against the high frequency vibrating glass honing plate for three equivalent strokes, then turned over and stroked on the other side. The process is repeated for the duration of setting of the electrical timer and finally comes to a convenient rest position. Supplied with coarse and fine abrasive in oil suspension. For 220/240V 50 Hz a.c. supplies. Each **£220. 0. 0.** *f*

PRICE including DUTY.

***MR-780**

MICROTOME, *International Minot*, **automatic rotary.** The extremely rugged construction of the *International Minot* Microtome is especially valuable in the sectioning of tough tissue or bone. Operation is vibration-free in order that sections do not crumble or distort. All parts are fabricated in rustproof nickel bronze and stainless steel with no paint or enamel to chip or stain. Any standard knife can be secured at the correct angle by means of thumb screws. The micrometer screw feed provides sectioning from 2 to 16 μm or with an accessory index post from 18 to 40 μm. A cryostat model for frozen sectioning is also available as shown below. Each **£275. 0. 0.** *fN*

PRICE does not include DUTY.

***MR-790**

MICROTOME-CRYOSTAT, *International-Harris* **Model CTD,** for frozen sectioning at −10° to −30°C. Features a 1/5 hp quick freeze system thermostatted ±1°C with indication of temperature at knife level. Incorporates Automatic Rotary Microtome MR-780. For 230V 50–60 Hz supplies only ... Each **£612. 0. 0.** *fN*

PRICE does not include DUTY.

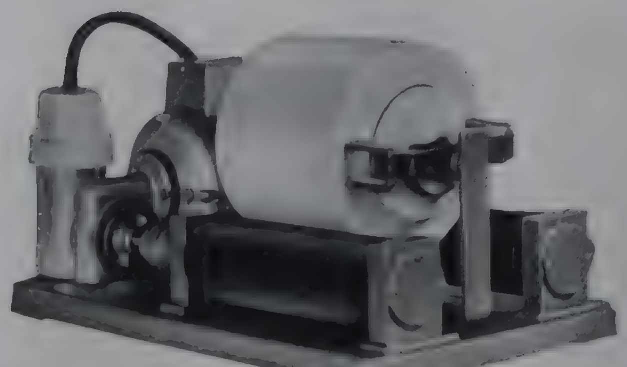
Items on this page normally available from stock except those coded *N*.

BALL GRINDING MILLS

MU-060

MILL, ball grinding, *Pascall* **Model 9,** material charge approximately 0·5 litre. The 5 cm dia. rubber covered rollers can accommodate containers up to 14 cm dia. and 18 cm long, such as a 1·0 litre porcelain pot or glass jar. The drive is from a fractional hp geared motor giving an output speed of 224 rev/min. Bench space required 38 × 22 cm. For 200/250V 50 Hz single phase supplies. **Without pot or ball charge** ... Each **£50. 0. 0.** *f*

For accessories see page 526.



MU-060 with MU-080
(MU-065 is similar but larger)

MU-065

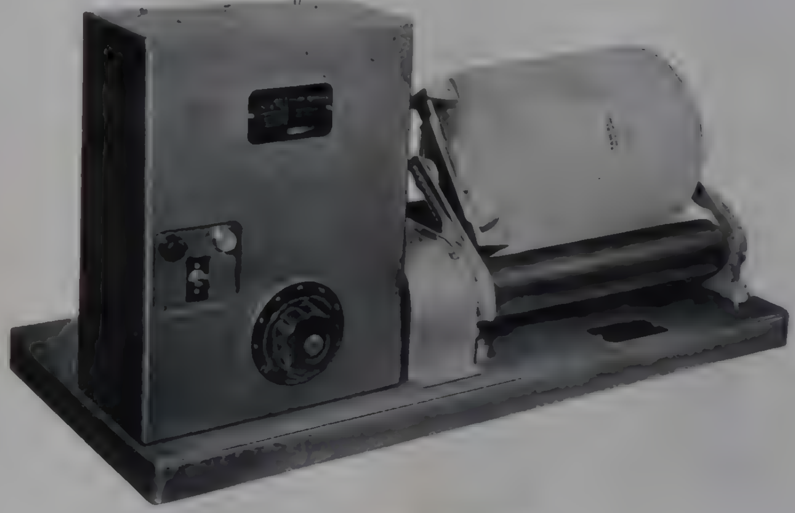
MILL, ball grinding, *Pascall* **Model 2,** material charge approximately 2 litres. The rubber covered rollers are 6·4 cm dia. × 35 cm long and can be adjusted to accommodate containers from 7·6 cm to 23 cm diameter. Suitable pot combinations are 2 × 1 litre, 1 × 2·5 litre or 1 × 4·5 litre pots. The drive is from a fractional hp motor giving an output speed of 182 rev/min. Bench space required 76 × 38 cm. For 220/240V 50 Hz single phase supplies. **Without pot or ball charges** ... Each **£90. 0. 0.** *f*

For accessories see page 526.

MU-067

MILL, ball grinding, as MU-065 but fitted with motor speed control giving stepless speed variation from 0 to 450 rev/min. Bench space required 80 × 36 cm. For 220/240V 50 Hz single phase supplies. **Without pot or ball charges** ... ... Each **£155. 0. 0.** *f*

For accessories see page 526.



MU-067 with MU-080

MU-072

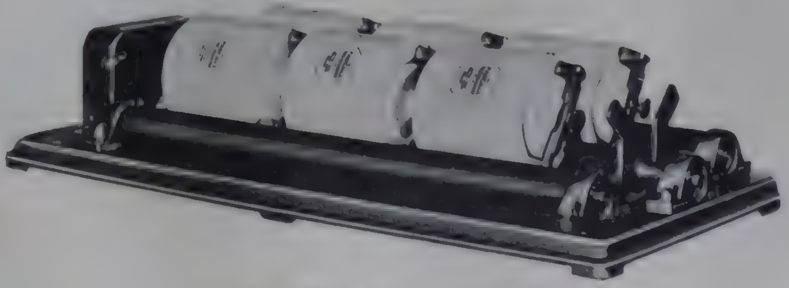
MILL, ball grinding, *Pascall* **Model 12,** material charge approximately 2 litres. With one fixed and two idler rubber covered rollers 5 cm dia. × 59 cm long which can be adjusted to accommodate containers from 5·7 cm to 14 cm diameter. The centre idler can be removed to convert the mill into a two roll unit capable of taking containers up to 16 cm diameter. Suitable pot combinations are 8 × 0·5 litre, 3 × 1 litre or 2 × 2·5 litre pots. The drive is from a fractional hp motor giving an output speed of 244 rev/min. Bench space required 102 × 41 cm. For 220/240V 50 Hz single phase supplies. **Without pot or ball charges** ... ... Each **£110. 0. 0.** *f*

For accessories see page 526.

MU-074

MILL, ball grinding, as MU-072 but fitted with motor speed control giving stepless speed variation from 0 to 450 rev/min. Bench space required 105 × 45 cm. For 220/240V 50 Hz single phase supplies. **Without pot or ball charges** ... ... Each **£175. 0. 0.** *f*

For accessories see page 526.



MU-072 with 6 × MU-080

When ordering please state voltage and nature of supply.

BALL GRINDING MILLS
(continued)

MU-076
with MU-080

MU-076

MILL, ball grinding, *Pascall* **Model 8** mounted on a steel frame. Material charge approximately 4 litres. With two rubber covered rollers 6 cm dia. × 90 cm long which can be adjusted to accommodate containers from 12 cm to 24 cm diameter. Suitable pot combinations are 2×4·5 litre, 3×2·25 litre, 5×1 litre or 6×0·5 litre pots. The steel frame has two compartments with access doors. One compartment houses the fractional hp motor drive which gives three alternative output speeds of 132, 190 and 277 rev/min. The second compartment provides useful storage space. Floor space required 102×54 cm. For 220/240V 50 Hz single phase supplies.
Each **£185. 0. 0.** *f*

ACCESSORIES FOR BALL MILLS MU-060 to MU-076

MU-080	**Ball mill pots, hard acid resisting porcelain with ground covers and fittings. Supplied complete with rubber gaskets for use when wet grinding with certain liquids.**
MU-081	**Ball charges.**
MU-082	**Strainer pourers, heavily plated metal.**

Nominal capacity litres	MU-080	MU-081	MU-082	
	Each			
0·5	£4. 10. 0.	£0. 15. 0.	£3. 10. 0.	*f*
1·0	£5. 0. 0.	£1. 0. 0.	£4. 10. 0.	*f*
2·25	£6. 0. 0.	£2. 0. 0.	£4. 10. 0.	*f*
4·5	£7. 0. 0.	£3. 10. 0.	£6. 0. 0.	*f*

HAND OPERATED GRINDING MILLS

MU-130

MILL, grinding, for clamping to bench or for wall mounting. Easily regulated for fine or coarse grinding. With grinding disk 9 cm dia. ... Each **£2. 2. 9.** *mS*

MU-130

GRAIN MILLS

MU-140

GRAIN MILL, working on the shearing principle, for reducing grain to evenly divided powder without undue temperature rise and without clogging. Four blades project radially into the milling chamber while a further four blades are driven by a constant speed motor at 2800 rev/min. With distributing and collecting chambers. **Without sieve.** For 200/250V a.c. supplies.
Each **£180. 0. 0.** *m*

When ordering please state voltage and nature of supply.

NOTE: A wide variety of sieves are available for grain mill MU-140; full details and prices on application.

MU-140

MU-145

GRAIN MILL, E.B.C. pattern. This mill has been specially designed for coarse and fine grinding in accordance with the requirements of the Analysis Committee of the European Brewing Convention. Size reduction is by the cutting action of 6 rotating knives against 4 stationary knives at a constant speed of 1100 rev/min. With one each standard sieve of 1 mm and 2·5 mm diameter respectively. For 220/240V 50 Hz single phase supplies ... ... Each **£207. 0. 0.** *m*

Available for 110/115V supplies to special order.

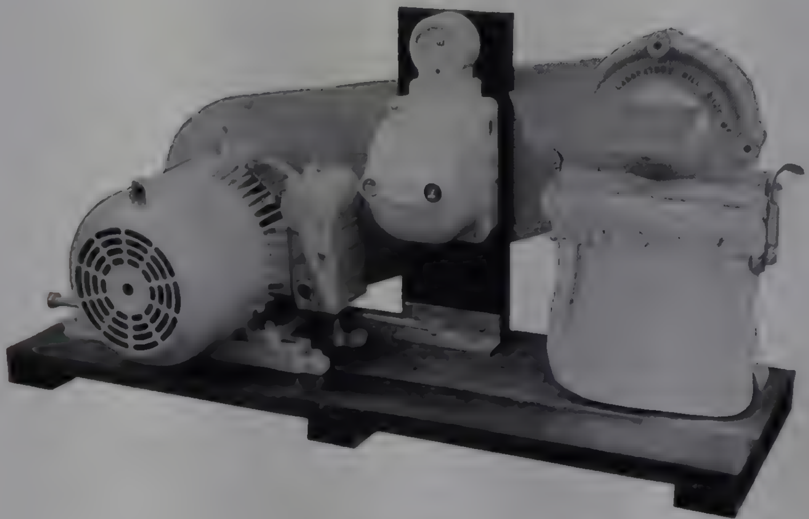
When ordering please state voltage and nature of supply.

Items on this page coded S normally available from stock.

GRINDING MILLS

Two sizes of *C & N* grinding mills are available. The high grade steel alloy grinding member is a four-armed beater-cross which revolves at high speed and shatters or tears sample passed into the feed aperture.

The ground sample passes through a screen into a collecting chamber.



MU-180

JUNIOR MILL

The 5 in (13 cm) diameter grinding chamber is fixed to the body by two thumbscrews and can be removed rapidly, exposing the perforated screen and grinding member.

Sample up to 9·5 mm maximum width is fed through a central aperture into the grinding chamber and the ground material is collected in a cloth sleeve.

MU-150

MILL, *C & N Junior*, **beater cross,** as specification with 5 in (13 cm) diameter grinding chamber and belt drive giving a beater-cross speed for 12,000 rev/min. Complete with capacitor start motor, starter and ammeter mounted on baseplate, feed tray, set of eight screens with circular perforations from 0·4 to 2·45 mm diameter, six collecting sleeves and spare drive belt. For 220/240V 50 Hz single phase supplies ... ... Each **£122. 10. 0.** *m*

SENIOR MILL

Similar to the Junior Mill but of sturdier construction and larger screening area.

Sample is fed through an aperture 3·8×3·0 cm, and the ground material is collected in a cloth bag which is detachable from the metal frame clipping it to the underside of the mill.

MU-180

MILL, *C & N Senior*, **beater-cross,** as specification with 8 in (20 cm) diameter grinding chamber and vee belt drive giving a beater-cross speed of 8000 rev/min. Complete with capacitor start motor, starter and ammeter mounted on baseplate, feed tray, set of eight steel plate screens with perforations from 0·4 to 2·45 mm, three collecting bags and spare pair of vee drive belts. For 220/240V 50 Hz single phase supplies ... ... Each **£134. 0. 0.** *m*

When ordering please state voltage and nature of supply.

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

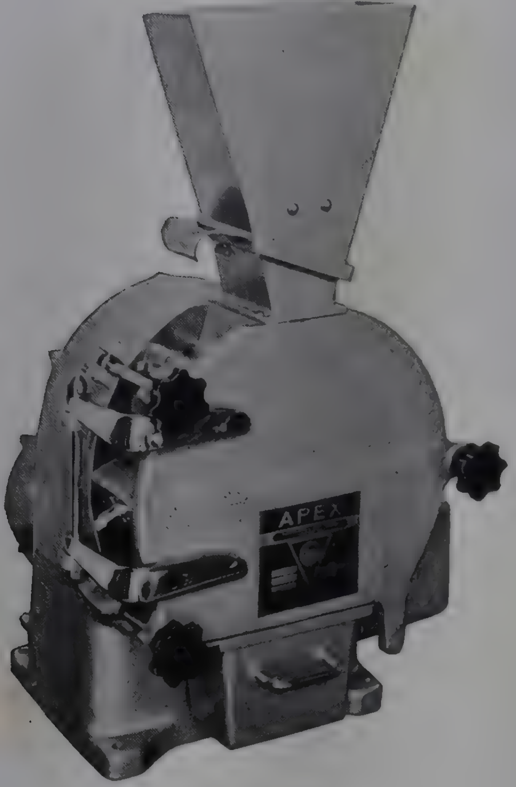
Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for standard packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'dozen' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about 50/0d. per dozen.

This system is intended to encourage ordering in standard packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

CUTTER MILL

For milling materials of a generally fibrous nature, such as paper, foodstuffs, wood, plastics, etc., without loss of moisture from the product due to heating caused by crushing or abrasion type mills.



MU-242

MU-242

MILL, cutter, *Apex*, steel and cast iron construction, for bench mounting. The 20 cm diameter, 7·5 cm deep cutting chamber has six stationary and four rotary knives driven at about 600 rev/min. The brass screen, dovetailed into the mill frame, is easily removed after opening the hinged door. The 1 litre aluminium receiver slides in grooves in the mill frame, so that no material will fall between it and the frame or door. The feed aluminium hopper has an inclined slide gate adjustable between 7·5 cm and 4·8 cm for regulating the feed. Overall dimensions 30 × 50 × 52·5 cm high. With brass screen having 1 mm perforations, $\frac{1}{2}$ hp motor and starter. For 220/240V 50 Hz single phase supplies. Each **£364. 10. 0.** *f*

REPLACEMENT PARTS

MU-252	**Set of knives,** comprising 4 rotary and 6 stationary knives	Set **£35. 0. 0.**	*f*

ACCESSORIES

MU-254	**Screens,** brass, with 0·5, 1, 2, 3, 4, 6 or 8 mm perforations	Each **£11. 0. 0.**	*f*

When ordering please state screen size.

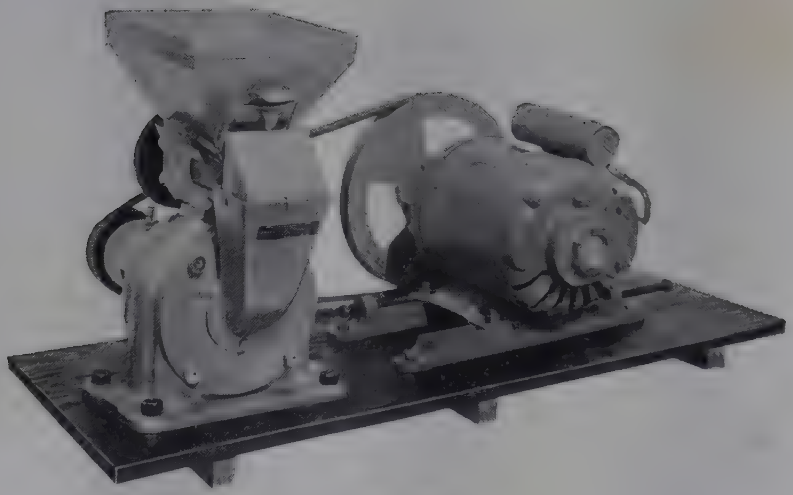
MU-256	**Safety switch** to prevent mill being started with door open. The switch is built-in and can only be supplied when ordered with the mill ...	Extra **£13. 0. 0.**	*f*

PULMAC MILL

For efficient and economical grinding from feed size 3 mm of a wide range of dry materials such as coal, metal ores, foodstuffs, paper, rubber, etc. down to particle sizes ranging from coarse granules to a very fine powder. The mill is vibrationless and can be mounted on bench or stand.

OPERATION

Material is fed from the adjustable feed hopper to the central orifice of the mill. Grinding action is by rotating and stationary crowns of special abrasion resisting alloy, composed of beaters and jagged serrations. The degree of fineness is determined by the clearance between the crowns, which can be quickly adjusted to suit the material product required. The ground material is drawn to the periphery by centrifugal force and ejected at the bottom of the mill. When very fine grinding is required, the final reduction is controlled by a screen placed round the revolving crown. Air induced into the mill by the high speed of the rotor crown aids the effect of the centrifugal force, cools the grinding surfaces, and helps prevent blockage of the screen perforations. The material can be collected in a porous fabric bag, which release the induced air, whilst keeping back the dust or fine particles. The rapid removal of the rotor crown from the shaft and the stator from the door facilitates easy cleaning.



MU-282

MU-282

MILL, grinding, *Pulmac*, as specification with $\frac{3}{4}$ hp motor, starter, vee belt drive and steel screen with 0·25 mm diameter perforations. For 220/240V 50 Hz single phase supplies ... ... Each **£87. 0. 0.** *m*

ACCESSORIES

MU-284	**Screens,** steel with 0·25, 0·5, 0·75, 1·0, 1·5 or 2 mm perforations	Each **£0. 18. 0.**	*m*

When ordering please state screen size. Screens up to 10 mm perforations available to special order.

When ordering please state voltage and nature of supply.

END RUNNER MILLS

Mechanically operated pestles and mortars of acid resistant porcelain for dry or wet grinding. A weighted pestle or runner is made to rotate by the friction between it and the rotating mortar. The pestle is free to rise and fall in the mortar, so that the grinding action is one of impact and shear. Both mortar and pestle have spring loaded scrapers, and the pestle may be swung clear of the mortar to facilitate emptying and cleaning. The mortar is fixed to a revolving table which is powered by an electric motor with push-button starter enclosed in the steel base.

MU-300

MILLS, end runner, grinding, *Pascall*, as specification, with pestle and mortar MU-305. For 220/240V a.c. supplies.

Size	0	1	
Mortar dia.	17·5	25 cm	
Each	**£115. 0. 0.**	**£195. 0. 0.**	f

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

MU-305 **Pestles and mortars,** acid resisting porcelain.

Size	0	1	
Set	£23. 0. 0.	£40. 0. 0.	f

MU-300 Size O

MECHANICAL MORTAR AND PESTLE

Designed to reduce 5 to 25 g of sample to a fine powder. The cast aluminium body is stove enamelled and mortars and pestles are available in either hardened steel or fused alumina. A quiet geared motor drives the pestle at 96 rev/min and the mortar at 32 rev/min in the opposite direction. The pestle head is retractable for ease of access to the mortar. A deflector is available to assist in grinding materials which have a tendency to cake. Mortar capacity approx. 90 ml.

MU-400

MORTAR AND PESTLE, mechanical, as specification, for operation on 200/220 or 230/250V a.c. single phase supplies. **Without mortar, pestle or deflector.** Each **£137. 19. 6.** f

When ordering please state voltage and nature of supply.

ACCESSORIES

MU-404	**Mortar and pestle** in hardened steel.	Set £32. 2. 6.	f
MU-406	**Mortar and pestle** in fused alumina.	Set £44. 3. 0.	f
MU-408	**Deflector** in resin-bonded fibre ...	Each £1. 1. 0.	f

MU-400 with accessories

MINCER

MU-660

MINCER, bench top mounting, hand operated. The body, worm feed and handle are high quality iron castings tin dipped. With two interchangeable mincer plates having 4·7 and 9·5 mm diameter holes respectively and a hardened steel rotary cutter. Incorporated in the base is a lever operated suction pad which fixes the mixer securely on any smooth surface. Average output, approx. 800 g/min. ... ... Each **£2. 11. 6.** *mS*

MU-660

Items on this page coded S normally available from stock.

MIXERS, EMULSIFIERS, HOMOGENISERS

MU-900

MU-900

MIXER, *Sunbeam*, for mixing pastes and viscous materials. With two chromium plated intermeshing beaters each 5 cm wide held in contra-rotating chucks geared to a fractional hp totally enclosed motor. A speed control is fitted providing 12 fixed speed steps from 250 to 850 rev/min. Mounted on stand with swivel bracket, handle and two heat resistant glass bowls capacities 850 ml and 2800 ml. For 210/250V a.c. or d.c. supplies.
Each **£28. 11. 4.** *m*

***MU-905**

MIXER, light duty, for blending liquifying and grinding small quantities of material. With motor, rated for intermittent operation up to 60 sec at a time, mounted in the base and operated by a press button. The middle compartment, closed with a plastics lid, contains a cutter for reducing nuts, grain, etc. to powder in a few seconds. Alternatively a transparent plastics upper compartment may be attached for mixing liquid materials. A plastics lid with funnel is provided for addition of material during mixing. For 220/250V 50 Hz supplies.
Each **£4. 16. 5.** *m*

MU-905

MU-915

MU-915

MIXER, *Sunbeam*, for blending, grinding, liquifying and disintegrating. The heat resistant 1 litre glass jar contains a six bladed stainless steel cutter. A plastics stopper is inserted in the centre of the lid in order that constituents may slowly be added during the mixing process. The jar stands on the base which houses an air-cooled motor for driving the cutter at either 12,000 or 18,000 rev/min, selected by a rotary switch. For 230/250V 50 Hz supplies ... ... Each **£18. 2. 6.** *m*

MU-917 **Glass jar, spare for above, complete with cutter and plastics lid** ... ... Each **£4. 8. 0.** *m*

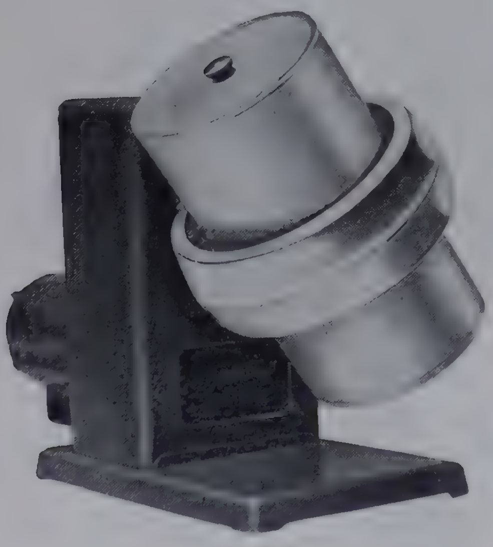
MU-920

MIXER, powder, capacity approx. 3 litres, for mixing trace components and other additives. The detachable thick Perspex container rotates in two planes simultaneously, one around its vertical axis, and the other about its vertical centre. This movement produces a complete and perfect mix very quickly. The container has two stationary spreaders across the centre for breaking up coagulating material and is held in position by a simple locking device. For 220/240V a.c. supplies. With container ... ... Each **£78. 13. 0.** *mN*

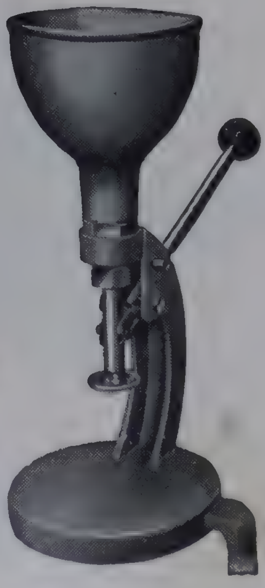
MU-922 **Container, Perspex, spare for above mixer.**
Each **£9. 7. 6.** *mN*

MU-942

EMULSIFIER, hand-operated, for emulsification of materials except those containing coarse solid matter or having very high viscosity. When the lever is operated at 80/90 strokes per minute, 500 ml of material are processed in 4 minutes. Comprises aluminium bowl and stand, copper alloy cylinder with leak-proof, close fitting piston, and all other contact parts of stainless steel. With bench clamp, two different size jets and jet cleaning tool.
Each **£10. 10. 0.** *f*



MU-920



MU-942

Items on this page normally available from stock except those coded *N*.

MU-950

HOMOGENIZER, *Minisonic* 4, for rapid emulsification of liquid mixtures on laboratory and pilot plant scale. An electrically driven pump forces the liquid to be processed into a whistle at a particular velocity. The crossover jet of the whistle creates a flat stream of liquid which causes the vibration of a blade at about 22 kHz. The speed of the blade vibration and the inherent inertia of the liquid induces very high cavitation forces which efficiently emulsify almost any mixture which can be pumped at sufficient speed. Output is about 3 litres/min depending upon viscosity of the sample. Two 3 litre glass vessels enable two phases of a mixture to be processed without premixing or several passes to be made. All metal parts in contact with the liquid are of stainless steel and the instrument is easily cleaned. With $\frac{1}{4}$ hp electric motor, pump, control valve and vibrating element. For 230V 50 Hz single phase supplies.

Each **£189. 0. 0.** *f*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

MU-954 **Kit of spares, comprising:**
12 vibrating element blades
8 U-rings for glass vessels
4 each 4 sizes sealing rings
2 glass vessels
1 set of tools ... ... Set **£16. 12. 0.** *f*

MIXER EMULSIFIERS

OPERATION

Materials are subjected to intense mixing and shearing actions and expelled with high velocity into the mix. By correct choice and positioning of the head, smooth mixing free from turbulence and aeration can be achieved.

CONSTRUCTION

All working parts are of stainless steel except the self-lubricating bushes which are normally of phosphor bronze or tufnol. Heads are quickly interchanged without the use of special tools. A submersible pump head is included with each outfit.

HEADS

Emulsor head, expels material horizontal to the rotor shaft and so creates a circular mixing motion.

Axial flow head, expels material upwards parallel to the rotor shaft. It is recommended for use where mixing free from aeration is required, and is specially suitable for preventing heavy liquids and insoluble solids settling during the mixing process.

Disintegrator head, used for rapid disintegration and suspension of fibrous materials. It can be used with the emulsor and axial flow heads.

Mesh head, used to assist processing and breaking down agglomerates. It can be used with the emulsor and axial flow heads.

Pump head, a submersible self priming centrifugal pump with an output of up to 18 l/min.

MU-960

MIXER EMULSIFIER, *Silverson,* **standard model,** as specification, with variable speed drive. Suitable for a maximum immersion depth of 24 cm and a minimum opening of 6 cm. Complete with emulsor, axial flow, disintegrator, mesh and pump heads and bench stand. For 200/240V 50 Hz single phase supplies.

Each **£45. 0. 0.** *mS*

MU-950

MU-960

MU-965

MU-965

MIXER EMULSIFIER, *Silverson,* **heavy duty model,** for processing viscous materials. As specification with variable speed drive. Suitable for a maximum immersion depth of 30 cm and a minimum opening of 6 cm. Complete with emsulsor, axial flow, disintegrator, mesh and pump heads and bench stand. For 200/240V 50 Hz single phase supplies ... ... Each **£75. 0. 0.** *mS*

Other voltage ranges are available to special order at extra cost.

When ordering please state voltage and nature of supply.

Outfits for micro disintegration, processing of highly abrasive materials and for working under aseptic conditions are available to special order. Further information available on receipt of full details of requirements.

Items on this page coded *S* **normally available from stock.**

Gallenkamp MINIMUM FREE SPACE OVEN AND DESICCATOR

FOR DETERMINATION OF MOISTURE IN COAL TO BS 1016 PART 1

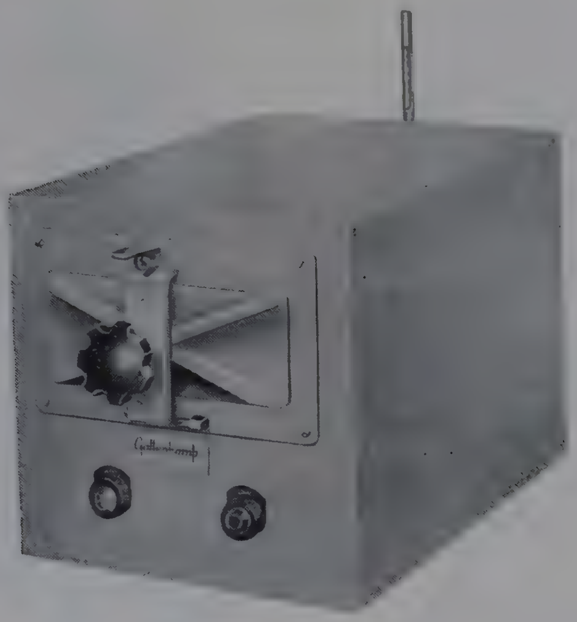
DESIGN AND OPERATION

The welded steel Interior is divided into two compartments by a fixed horizontal baffle. Nitrogen fed in via a dispersion tube at the rear of the upper compartment, is heated in its passage through this compartment, passes uniformly over samples in the lower compartment and leaves the oven through a collection tube at the rear. Both inlet and outlet tubulures are 10 mm outside diameter.

The hinged door, fitted with a quick release catch, has a soft rubber gasket and is tightened by a handwheel and yoke to form an airtight seal.

Temperature control is by means of a bimetallic thermostat with heater power switched by a relay. A metal-sheathed angle thermometer and mains and load indicator lamps are fitted.

The oven is supplied with a shallow nickel plated brass tray large enough to accommodate eight 65 mm moisture dishes.



MV-470

MV-480

PERFORMANCE AND DIMENSIONS

Total temperature fluctuation and variation ±2·5°C in the range 105–110°C.

Capacity: Eight 65 mm moisture dishes.

Power rating, max. 250W

Dimensions

	H	W	D
Internal	2·2 ×	17 ×	22 cm
External	28 ×	29 ×	37 cm

Weight, net 20 kg

MV-470

MINIMUM FREE SPACE OVEN, *Gallenkamp,* as specification, with bimetallic thermostat, power relay, angle thermometer and 30 × 16 cm plated brass tray. For single phase a.c. or d.c. supplies.

For 220/240V	Each	**£97. 0. 0.**	*b*
For 200/210V	Each	**£97. 0. 0.**	*bN*
For 110/120V	Each	**£97. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

MV-472	**Heating elements**	Set	**£4. 4. 0.**	c
MV-474	**Tray,** nickel plated brass, 30×16 cm, to hold eight 65 mm moisture dishes BH-185 ...	Each	**£1. 18. 0.**	c
MV-476	**Angle thermometer,** solid stem, scale span 80 to 125°C, subdivided in 1°C	Each	**£1. 16. 0.**	c

When ordering replacement electrical parts please state Serial No. of oven and voltage and nature of supply.

ACCESSORIES

BH-185	**Basins** (moisture dishes) to BS 1016 Part 1	For details and prices see entries in List No. sequence.
FL-552	**Flowmeter,** with capillary size No. 7 with certificate of calibration.	

MV-480

DESICCATOR, MINIMUM FREE SPACE, *Gallenkamp*, used in conjunction with oven MV-470, for cooling samples in a nitrogen atmosphere after drying, thereby reducing the time taken for each determination. The desiccator consists of a welded steel box 3·8×17×34 cm inside, fitted with a hinged door which is faced with a soft rubber gasket and screw closure to provide a gas tight seal. The bottom of the desiccator is 1 cm thick and acts as a heat sink to reduce sample cooling time. Gas inlet and outlet tubulures of 10 mm outside diameter are fitted to enable nitrogen to be passed through the desiccator ... ... Each **£32. 0. 0.** *b*

Other equipment used in the determination of water content.

EJ-960 et seq.	Karl Fischer apparatus.	SH-080 et seq.	Soil tensiometers.
OV-010 et seq.	Drying ovens.	WJ-130 et seq.	Dean and Stark apparatus.

For full details see entries in List No. sequence.

Items on this page normally available from stock except those coded *N*.

Gallenkamp VACUUM DRYING OVEN

FOR MOISTURE DETERMINATION OR DRYING UNDER VACUUM AT TEMPERATURES UP TO 140°C

- **Robust cast light alloy vacuum chamber**
- **Easy-open door with tubular rubber seal**
- **Built-in thermostat and vacuum gauge**
- **3-way vacuum tap for—evacuation**
  —isolation
  —refilling the chamber

PERFORMANCE AND DIMENSIONS

Temperature range	50 to 140°C			
Temperature fluctuation	1°C			
Temperature variation	±1°C			
Power rating max.	200W			
Dimensions	H	W	D	
Internal	7	× 20	× 33	cm
External	30	× 25	× 58	cm
Weight, net	20 kg			

DESIGN

A thermostatically controlled hotplate is mounted on the base of the vacuum chamber. Samples are normally contained in flat metal dishes which make good thermal contact with this hotplate and therefore rapidly reach temperature equilibrium with it. For measurement of hotplate temperature, a tubulure is fitted, through which a thermometer may be inserted, the seal being effected with rubber tubing.

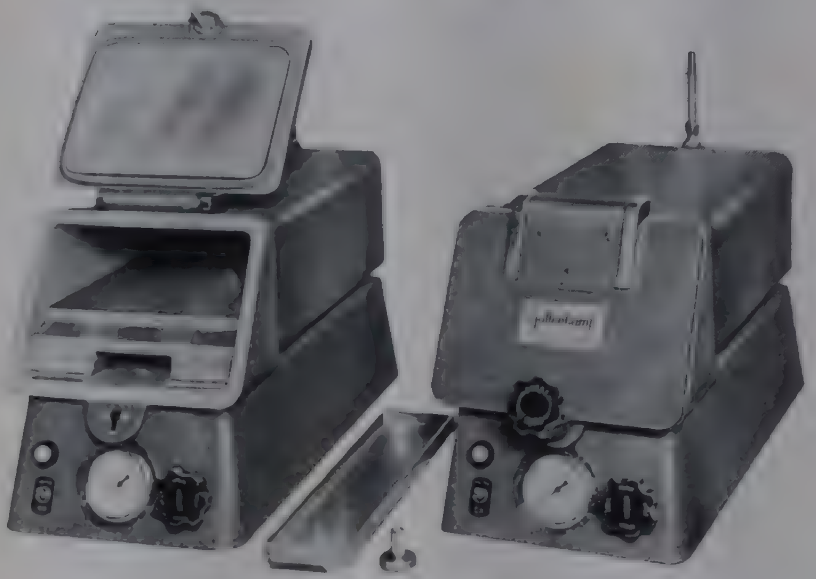
The bimetallic thermostat controls the heater load through a power relay.

MV-600

VACUUM OVEN, *Gallenkamp*, as specification with cast light alloy vacuum chamber, easy-open door, bimetallic thermostat, power relay, 3-way vacuum tap, vacuum gauge and one each thermometers MV-616 and MV-618. For a.c. single phase or d.c. supplies.

For 220/240V	Each	**£154. 0. 0.**	*b*
For 200/210V	Each	**£154. 0. 0.**	*bN*
For 110/120V	Each	**£154. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.



MV-600

REPLACEMENT PARTS

MV-612 **Heating element,** 200W ... ... Set **£5. 14. 0.** *b*

When ordering replacement electrical parts please state Serial No. of oven and voltage and nature of supply.

MV-614 **Door gasket,** rubber ... ... Each **£0. 4. 3.** *b*

Thermometers, Oven, solid stem, with graduations commencing about 120 mm from base of mercury bulb. Overall length about 180 mm, stem diameter 5 to 6 mm.

List No.	Scale span °C	Subdiv. °C	Dozen	Each	
MV-616	50 to 110	1·0	**145/–**	**13/3**	c
MV-618	95 to 145	1·0	**145/–**	**13/3**	c

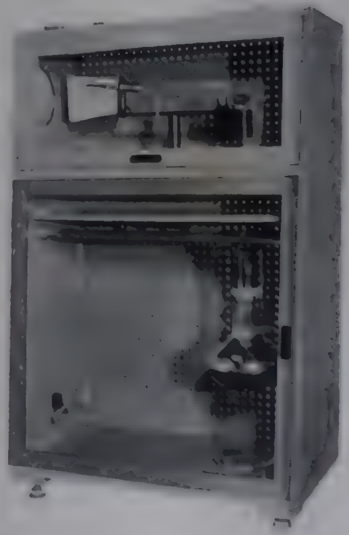
For a wide range of suitable sample containers please see BASINS and DISHES. See also OV-440 Moisture Extraction Oven and OV-930 Vacuum Oven.

MOISTURE TESTER

MV-660

MOISTURE TESTER, infrared balance type, for moisture determination in granular and powdered substances. The upper section of the three compartment cabinet contains a balance beam with rider bar scaled 0–100% moisture in 5% divisions and a pointer on the end of the beam which moves over a scale of 5% dividend in 0·1%. The other end of the beam carries a suspension system which passes down through the middle heat insulating compartment to support a detachable concave pan below the heater. For 240/250V a.c. supplies.

Each **£57. 10. 0.** *fN*



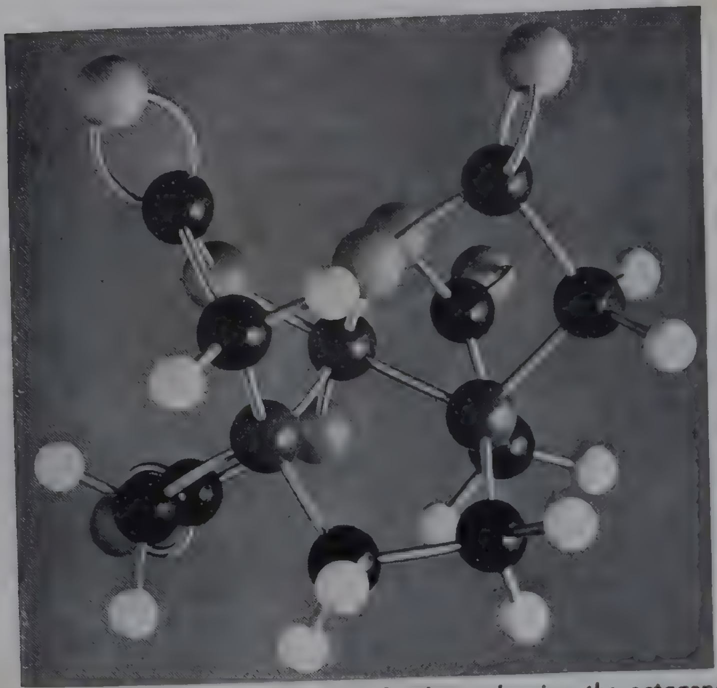
MV-660

MOISTURE DETERMINATION

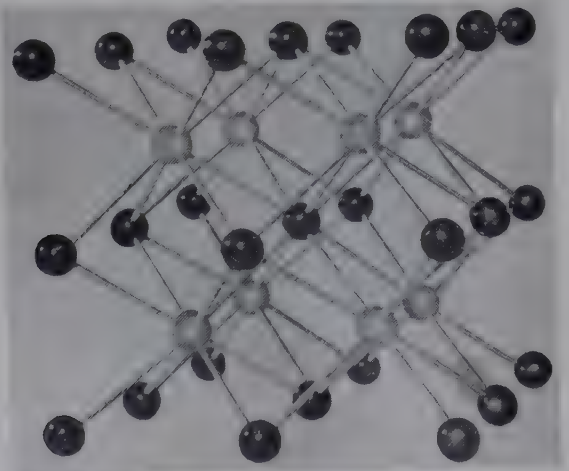
In air	see	HYGROMETERS
In liquids		
Karl Fischer	see	ELECTROCHEMICAL ANALYSIS
Dean & Stark	see	WATER DETERMINATION
In soil	see	SOIL TESTING

Items on this page normally available from stock except those coded *N*.

Gallenkamp MOLECULAR MODELS


Model of the calcium complex of e.d.t.a. showing the octagonal structure of the calcium atom and its occurrence in five 5-membered rings

Diamond lattice showing tetrahedral arrangement of carbon atoms


A body-centred cubic lattice for illustrating the arrangement of the crystal axes

Originally suggested by Professor W. H. Linnell, D.Sc., Ph.D., F.P.S., F.R.I.C. and repeatedly improved in the light of experience, these models provide a simple means of demonstrating many aspects of molecular and crystal structure for education and research purposes.

FOR ORGANIC CHEMISTRY

- to exhibit stereochemical properties
- better benzene ring models
- inter-nuclear distances correctly scaled
- true valence angles
- approximate indication of electron density
- for construction of highly strained molecule models.

FOR INORGANIC CHEMISTRY

- for construction of practically any inorganic model
- the modern approach to electron structure of compounds
- to exhibit sterochemical properties
- especially useful for metal co-ordination chemistry
- wide range of symmetries available.

FOR CRYSTALLOGRAPHY

- vivid spatial representation of atoms in lattices
- invaluable for discussion of crystal properties.

The model atoms are moulded polythene spheres in white (16 mm dia.) and various colours (22 mm dia.). They are drilled with holes which accept the spring bonds. Hole configurations are as follows:

1-hole
2-holes—holes subtend an angle 109° at the centre of the sphere.
4-holes—directed from the centre towards the apices of a regular tetrahedron.
5-holes—directed from the centre towards the apices of a regular trigonal bipyramid.
6-holes—directed from the centre towards the apices of a regular octahedron.
8-holes—directed from the centre towards the corners of a cube.
14-holes—positioned in a unique pattern which enables all common chemical symmetries to be represented.

The connecting springs are close-wound helices of plated steel and are available in four lengths—25 mm, 38 mm, 60 mm and 75 mm. Each spring is tapered at either end to fit securely and to a constant depth in all drillings. The models constructed are sufficiently rigid to withstand lecture and classroom handling and due to the use of springs for bonding, atomic vibrations can be demonstrated.

CHEMISTRY AND CRYSTALLOGRAPHY SETS

Introductory sets MV-800 and MV-805 are listed to include useful quantities of spheres and springs for general trial purposes or individual student use.

The chemistry set enables simple molecules and ions to be made and stereochemical and structural distinctions to be clearly illustrated.

The crystallography set enables the same spheres to be used in constructing several different lattice types.

DEMONSTRATION SET

Modern chemistry teaching courses require sets of model atoms both for demonstration purposes and for student participation in model construction. Conveniently packed in a multi-drawer cabinet, the demonstration set MV-870 is suitable for making numerous models of which the following are examples:

Crystal lattices

Sodium chloride, caesium chloride, calcium fluoride, zinc blende, diamond, graphite and ice.

Molecules and ions

Phosphorus, sulphur, phosphorus pentoxide, phosphorus pentachloride, phosphate, carbonate, sulphate, nitrate and ammonium.

Gallenkamp MOLECULAR MODELS

(continued)

MV-800

MOLECULAR MODELS, *Gallenkamp*, **chemistry set,** as specification, including instructions leaflet. Comprises the following components packed in a plastics box.

40 white balls MV-810
6 green balls MV-812
6 red balls MV-814
20 black balls MV-816
6 blue balls MV-818
6 yellow balls MV-820
6 yellow balls MV-821
6 black balls MV-822
2 brown balls MV-824
40 springs 25 mm MV-840
40 springs 38 mm MV-840

Dozen sets **£42. 0. 0.** Set **£3.16. 0.** *b*

MV-800

MV-805

MOLECULAR MODELS, *Gallenkamp*, **crystallographic set,** as specification, including instructions leaflet. Comprises the following components in a plastics box.

36 brown balls MV-824
36 orange balls MV-826
36 purple balls MV-828
150 springs 38 mm MV-840
150 springs 60 mm MV-840

Set **£8.15. 0.** *b*

COMPONENTS

MODEL ATOMS

List No.	Element	Colour	Dia. mm	Holes	12 packs	Pack of 12	
MV-810	Hydrogen	White	16	1	36/–	4/6	*b*
MV-811‡	Hydrogen	White	16	1	36/–	4/6	*b*
MV-812	Halogen	Green	22	1	44/–	5/–	*b*
MV-814	Oxygen	Red	22	2	56/–	6/–	*b*
MV-816	Carbon	Black	22	4	70/–	7/–	*b*
MV-817	Zinc	Brown	22	4	70/–	7/–	*b*
MV-818	Nitrogen	Blue	22	4	70/–	7/–	*b*
MV-819	Oxygen	Red	22	4	70/–	7/–	*b*
MV-820	Sulphur	Yellow	22	4	70/–	7/–	*b*
MV-821	Sulphur	Yellow	22	14	135/–	12/–	*b*
MV-822	Carbon	Black	22	14	135/–	12/–	*b*
MV-824	Metals	Brown	22	14	135/–	12/–	*b*
MV-826	Universal	Orange	22	14	135/–	12/–	*b*
MV-828	Universal	Purple	22	14	135/–	12/–	*b*
MV-830	Carbon	Black	22	5	76/–	7/6	*b*
MV-832	Sodium	Yellow	22	6	84/–	8/–	*b*
MV-833	Halogen	Green	22	6	84/–	8/–	*b*
MV-836	{Calcium Caesium}	Yellow	22	8	96/–	9/–	*b*
MV-837	Halogen	Green	22	8	96/–	9/–	*b*

‡ Ball drilled completely through to represent hydrogen in hydrogen bonding.

SPRINGS

MV-840 **Spring bonds.** Close wound spiral springs, electroplated finish.

Overall length	25	38	60	75 mm	
Gross	33/–	33/–	33/–	38/–	*b*
Dozen	4/3	4/3	4/3	4/7	

MV-870

MV-870

MOLECULAR MODELS, *Gallenkamp*, **demonstration set,** as specification, stored in multi-drawer cabinet with printed labels, and illustrated instructions leaflet.

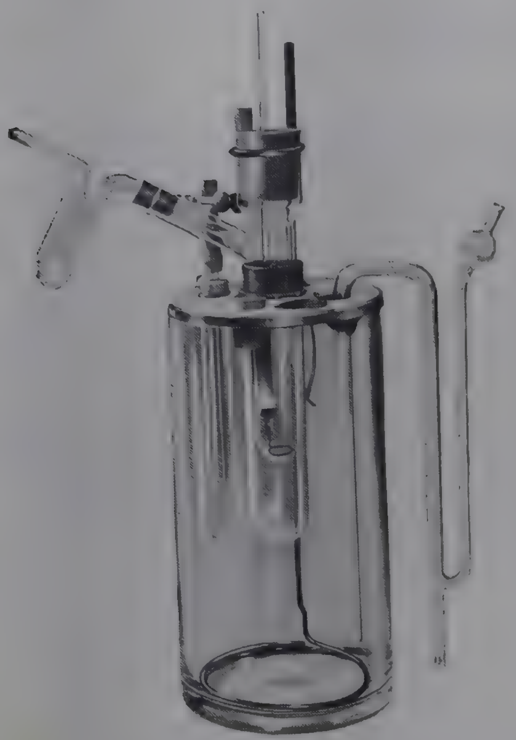
Comprises:

36 white balls MV-810
48 white balls MV-811
24 red balls MV-814
72 black balls MV-816
36 brown balls MV-817
24 blue balls MV-818
36 red balls MV-819
36 yellow balls MV-820
72 black balls MV-830]
48 yellow balls MV-832
48 green balls MV-833
24 yellow balls MV-836
48 green balls MV-837
420 springs 60 mm MV-840
84 springs 38 mm MV-840
12 springs 25 mm MV-840
1 organic chemistry stencil SP-960 with instructions booklet

Set **£26. 0. 0.** *b*

Stencil for drawing representations of models made with these sets see SP-960 in List No. sequence.

All items on this page normally available from stock.



MW-020

MW-020

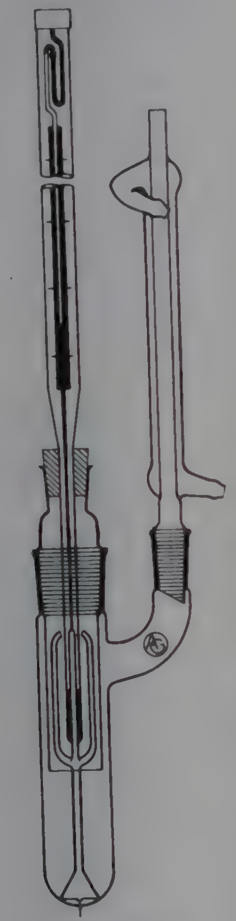
MOLECULAR WEIGHT APPARATUS, Beckmann freezing point method, as described by Findlay†, comprises a stout glass cooling vessel 22·5 cm high and 12·5 cm diameter with a plated metal cover. Through this cover are fitted the various components; air jacket tube containing the freezing tube with side arm, siphon tube and nickel stirrer for the cooling vessel, test tube containing a glass tube for transferring crystals to the freezing tube, and a thermometer. The freezing tube accepts a Beckmann thermometer and stirrer and is fitted with a side arm to which a filling pipette is connected. **Without thermometers.** Each £7. 15. 0. *a*

REPLACEMENT PARTS

JE-100	**Cooling vessel, 22·5 × 12·5 cm.** See entry in List No. sequence.			
MW-024	**Freezing tube, with side arm** ...	Each	£0. 13. 0.	*a*
MW-026	**Air jacket tube**	Each	£0. 4. 3.	*a*
MW-028	**Filling pipette**	Each	£0. 8. 9.	*a*

ACCESSORIES

TJ-174	**Thermometer, for cooling vessel,** B. 60C/100	For prices see entries in List No. sequence.
TJ-521	**Thermometer, Beckmann, with** top zero	



MW-090

MW-050

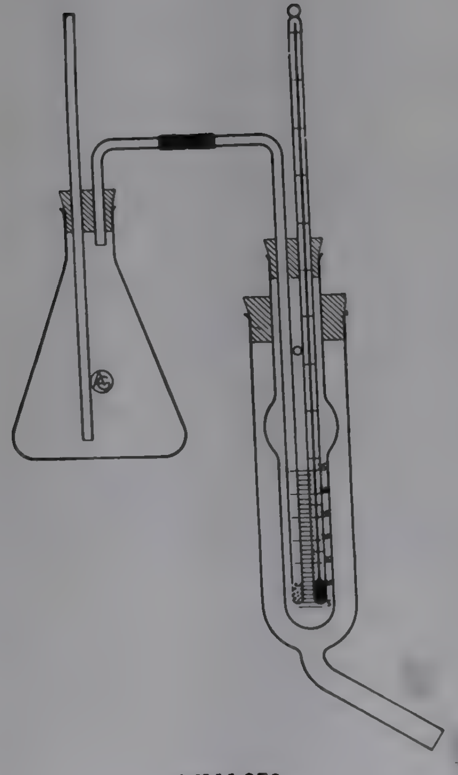
MOLECULAR WEIGHT APPARATUS, Landsberger boiling point method. Comprises 150 ml conical flask connected to a glass tube graduated 5 to 35 cm^3 in 1 cm^3, with outer glass jacket. With bends and centre spray tube. **Without thermometer.**
Each £2. 18. 0. *a*

REPLACEMENT PARTS

MW-052	**Inner tube,** graduated 5 to 35 cm^3	Each	£0. 17. 0.	*a*
MW-054	**Outer jacket**	Each	£0. 10. 6.	*a*
FJ-050	**Flask,** conical, 150 ml. For price see entry in List No. sequence.			

ACCESSORIES

CU-320	**Condenser, Liebig, 25 cm,** for connection to vapour outlet ...	For details and prices see entries in List No. sequence.
TJ-150	**Thermometer,** total immersion ...	
TJ-523	**Thermometer, Beckmann, with** bottom zero	



MW-050

MW-090

MOLECULAR WEIGHT APPARATUS, Washburn and Read boiling point method incorporating the Cottrell pump, as described by Findlay†. Comprises a boiling tube with a short tungsten wire sealed into the base to give steady heating, a 29/32 socket and a side arm with a 14/23 socket. A thermometer adapter with a cylindrical extension to shield the bulb fits into the main socket while a Liebig condenser fits into the side arm socket. The Cottrell pump rests inside the boiling tube and has three branches terminating above the bulb. **Without Beckmann thermometer.**
Each £2. 19. 0. *a*

REPLACEMENT PARTS

MW-092	**Boiling tube,** with 29/32 and 14/23 sockets.	Each	£0. 19. 0.	*a*
MW-094	**Thermometer adapter,** with 29/32 cone.	Each	£0. 8. 3.	*a*
MW-096	**Cottrell pump**	Each	£0. 16. 0.	*a*
MW-098	**Condenser, Liebig,** 20 cm, with 14/23 cone.	Each	£0. 16. 0.	*a*

ACCESSORY

TJ-523	**Thermometer, Beckmann,** with bottom zero. For details and price see entry in List No. sequence.

TABLET PRESSES for use with above apparatus see PU-200 in List No. sequence.

THERMOMETER VIBRATOR for use with Beckmann thermometers see TJ-908 in List No. sequence.

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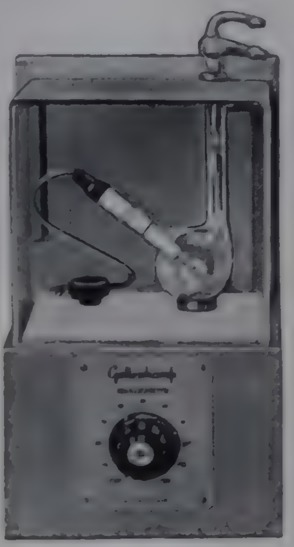
† Findlay 'Practical Physical Chemistry' 1954.

All items on this page normally available from stock.

Gallenkamp HEITLER SEMI-MICRO EBULLIOMETER

Designed in consultation with C. Heitler,
Department of Chemistry, The City University, London.

- **Molecular weight determinations of organic solids and liquids by boiling point elevation method**
- **Reaction kinetics studies using potentiometric recorder**
- **Polymerisation and saponification studies.**



PERFORMANCE AND OPERATION

Rapidly and accurately measures elevations down to 0·0005°C in the boiling points of organic solvents on the addition of the solutes. With chemical systems behaving normally, molecular weights of up to 500 may be determined to within 1%. For higher molecular weights, solution concentrations are smaller and the solvent must be stabilised. Molecular weights of 500 to 1000 may be determined to within 2%. Where known standards at comparable molecular weight and composition are available, molecular weights of 1000 to 5000 may be determined to about 3%.

CONSTRUCTION AND DIMENSIONS

A complete ebulliometer outfit comprises either one or two borosilicate glass ebulliometer vessels in heating stands, a thermistor bridge and a galvanometer, with connecting leads.

Vessel and heating stand

The vessel is a modified Cotterell pump with a tungsten wire fused into the base to conduct heat to the solution. Efficient boiling produces rapid circulation of an intimate foam of solution and vapour thus providing conditions under which the boiling point is precisely measured. Boiling temperature is sensed by a thermistor probe in the foam. The vapour condenses on a 'cold finger', and condensate returns steadily to the boiler. In this way a state of dynamic equilibrium is attained.

The stand comprises a base with heating element and control, surmounted by a plastics draught shield.

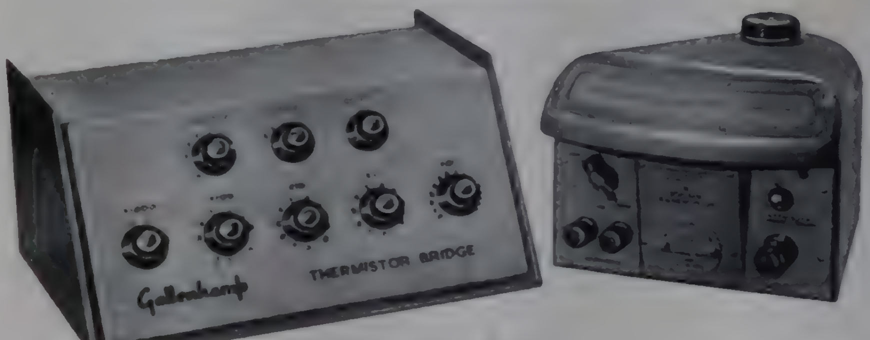
Thermistor bridge and galvanometer

The four decade bridge can either be connected to two vessels, one for measuring boiling point, the other compensating for changes in ambient pressure, or for less accurate work to the measuring vessel only. Resistance is measured to within 0·1 Ω. The galvanometer is a taut suspension type with a 6-position sensitivity control; coil resistance 1400 ohms; maximum sensitivity 180 mm/μA. For reaction kinetics studies the galvanometer must be replaced by a potentiometric recorder of sensitivity 2·5 mV and chart speed 60 cm/hr to 60 cm/day depending on reaction rate.

Dimensions and weights	H W D	Net wt.
Vessel and heating stand	36 × 18 × 17 cm	2·6 kg
Thermistor bridge	15 × 28 × 27 cm	3·5 kg
Galvanometer	16 × 19 × 28 cm	2·6 kg

BIBLIOGRAPHY

1. Heitler, C., Chem. & Ind. 1952, 875. A paper on original kinetic study work.
2. Heitler, C., Analyst 1958, 83, 223-229. The original paper describing the ebulliometer.
3. Heitler, C., J. Chem. Soc., 1963 4885-4889. An ebulliometric study of the kinetics of the Knoevenagel reaction.
4. Heitler, C., Talanta 11, 1081-1085. An ebulliometric study of the kinetics of the ethanolysis of ester groups.
5. Heitler, C., Talanta 1964, 11, 1471-1487. The most detailed survey of the sources of error in ebulliometric work, giving a clear account of the effects of stabilisers and describing methods of correction of results.



MW-140

MW-140

SEMI-MICRO EBULLIOMETER, *Gallenkamp*, **Heitler,** outfit comprising **one** vessel and heating stand, thermistor bridge with battery, galvanometer and instructions manual. For a.c. single phase supplies.

For 220/240V	Each	**£153.10. 0.**	*g*
For 200/210V	Each	**£153.10. 0.**	*gN*
For 110/120V	Each	**£153.10. 0.**	*gN*

MW-145

SEMI-MICRO EBULLIOMETER, *Gallenkamp*, **Heitler,** outfit as MW-140 but includes **two** vessels and heating stands (one for measuring and the other for compensating). For a.c. single phase supplies.

For 220/240V	Each	**£185.10. 0.**	*g*
For 200/210V	Each	**£185.10. 0.**	*gN*
For 110/120V	Each	**£185.10. 0.**	*gN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

MW-152	**Ebulliometer vessel**	Each	£3. 10. 0.	*a*
MW-154	**'Cold finger' condenser**	Each	£0. 12. 0.	*a*
MW-156	**Thermistor element,** pre-aged, in PTFE cone. For use in MW-140	Each	£4. 10. 0.	*b*
MW-158	**Thermistor elements,** matched pair of MW-156. For use in MW-145	Pair	£9. 10. 0.	*b*
MW-160	**Battery,** 9V *Ever-Ready* type PP11.	Each	£0. 5. 6.	*m*
MF-380	**Heating element,** for heating block (two required). For price see entry in List No. sequence.			

ACCESSORIES

EF-680	**Recorder,** *Smiths*	Specifications and prices see entries in List No. sequence.
EF-690	**Recorder,** *Leeds and Northrup* ...	
PU-200	**Tablet press,** 5 mm	
PU-202	**Tablet press,** 2 mm	

Items on this page normally available from stock except those coded *N*.

MW-730
MW-735

MW-730

MORTARS AND PESTLES, acid proof vitreous porcelain, **unglazed.** Pestles have wooden handles.

Outside dia. Capacity approx.	8 60	9 115	11 200	13 cm 280 ml	
Dozen Each	**104/–** **9/6**	**120/–** **11/–**	**160/–** **14/6**	**175/–** **16/–**	c

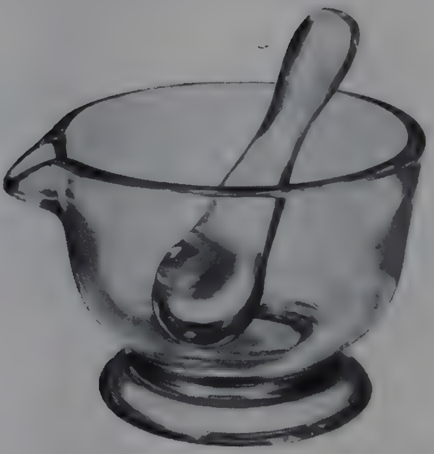
Outside dia. Capacity approx.	16·5 570	20 1100	25 2300	30·5 cm 4500 ml	
Dozen Each	**255/–** **23/6**	**370/–** **34/–**	**540/–** **49/–**	**1000/–** **90/–**	c

MW-735

MORTARS AND PESTLES, acid proof vitreous porcelain, **completely glazed.** Pestles have wooden handles.

Outside dia. Capacity approx.	8 60	9 115	11 200	13 cm 280 ml	
Dozen Each	**145/–** **13/3**	**170/–** **15/6**	**220/–** **20/–**	**235/–** **21/6**	c

Outside dia. Capacity approx.	16·5 570	20 1100	25 2300	30·5 cm 4500 ml	
Dozen Each	**340/–** **31/–**	**490/–** **45/–**	**720/–** **66/–**	**1360/–** **125/–**	c



MW-770

MW-770

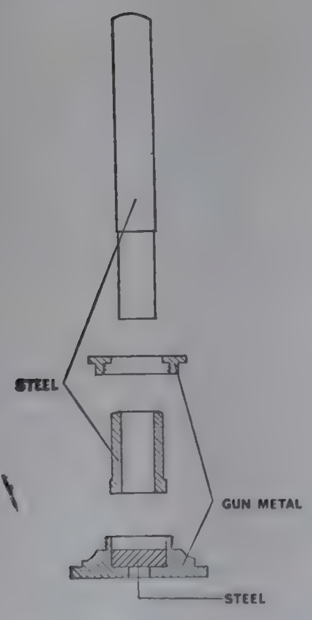
MORTARS AND PESTLES, glass, with foot and spout.

Outside dia. Capacity approx.	5 30	8 80	11 230	15 850	20 cm 1500 ml	
Dozen Each	**94/–** **8/9**	**110/–** **10/–**	**140/–** **12/9**	**250/–** **23/–**	**470/–** **43/–**	c

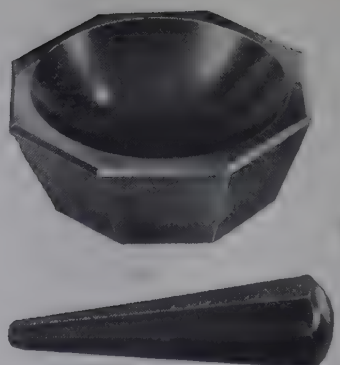
MW-800

MORTARS AND PESTLES, percussion, **steel.** The hardened steel mortar comprises a cylindrical body with separate bottom plug which are held together by a two-piece gunmetal base, the whole being readily dismantled for cleaning. The close fitting cylindrical pestle is of hardened steel.

Dia. of pestle	17	28 mm	
Each	**102/–**	**145/–**	c



MW-800



MW-820

***MW-820**

MORTARS AND PESTLES, agate, highly polished. The natural stone is cut so that working area is as free as possible from blemishes.

Dia. external Dia. internal	40 34	57 51	70 60	85 76	100 mm 87 mm	
Each	**90/–**	**104/–**	**140/–**	**220/–**	**320/–**	c

For **Mechanical Mortars and Pestles** see MU-300 and MU-400 in List No. sequence.

All items on this page normally available from stock.

VARIABLE SPEED MOTORS

MX-550

MOTORS, series wound, geared. A continuously rated fan cooled motor in drip-proof frame with integral ON/OFF switch and speed controlling potentiometer. Output shaft, diameter $\frac{5}{16}$ in, supplied in position shown is readily adjustable to any of twelve positions set at 30° to each other. Overall dimensions 23×9×9 cm. For 200/250V a.c. supplies only.

On-load speed range approx.		
Rev/min min.	5	2
Rev/min max.	25	10
Torque kgf cm	4·7	4·7

Both ranges Each **£19. 10. 0.** *mN*

When ordering please specify voltage and nature of supply and speed range required.

MX-560

MOTOR, universal, series wound, electronically controlled, *Hanovia* Model 101, incorporating motor MX-606 and providing an infinitely variable speed control between zero and 86 rev/min, with a final shaft torque of 5·7 kgf cm at maximum speed. The motor field is energised by d.c. from a rectifier and the armature is supplied with regulated pulses of energy through a thyratron valve. Speed control is effected either by a pre-set potentiometer regulating the phase of the input a.c. to the valve grid or by a separate, manually operated potentiometer regulating the mean d.c. potential at the grid. For 220/240V 50/60 Hz supplies. Each **£35. 10. 0.** *fN*

When ordering please state voltage and nature of supply.

UNIVERSAL MOTORS
TO BS 170

With stove enamelled frames, self-oiling self-aligning bearings and enclosed cooling fans. Rotation is counterclockwise and speeds quoted are on load speeds with a.c. operation.

MX-602

MOTORS, universal, series wound, as specification. Overall dimensions 16×9×9 cm high. Output shaft diameter $\frac{5}{16}$ in. For 220/240V a.c. single phase or d.c. supplies.

Rev/min	2000	4000	6500
hp approx.	1/75	1/20	1/10
Input, W	30	85	140

All ranges Each **£8. 0. 0.** c

MX-606

MOTORS, universal, series wound, as specification, with single reduction gear. Overall dimensions 18×9×11 cm high. Output shaft diameter $\frac{3}{8}$ in. For 220/240V a.c. single phase or d.c. supplies.

Rev/min	50	100	200	500
hp approx.	1/40	1/20	1/20	1/20
Full load torque kgf cm	11·5	17·3	11·5	5·2

All ranges Each **£12. 10. 0.** c

MX-610

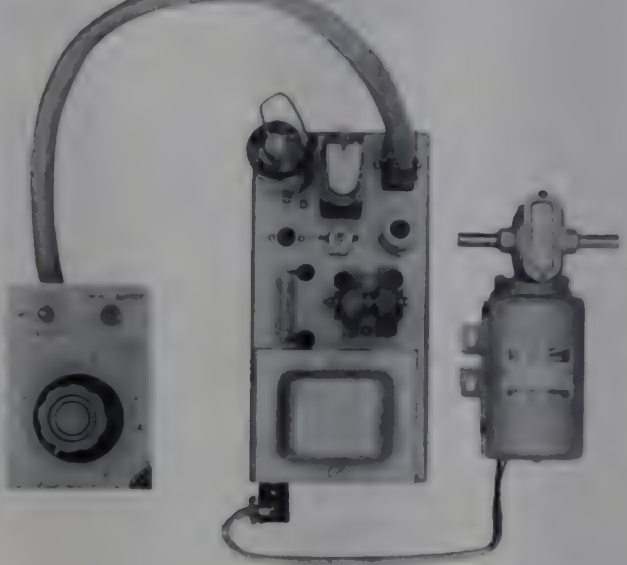
MOTORS, universal, series wound, as specification with double reduction gear. Overall dimensions 20×9×13 cm high. Output shaft diameter $\frac{3}{8}$ in. For 220/240V a.c. single phase or d.c. supplies.

Rev/min	5	10
hp approx.	1/50	1/40
Full load torque kgf cm	35	35

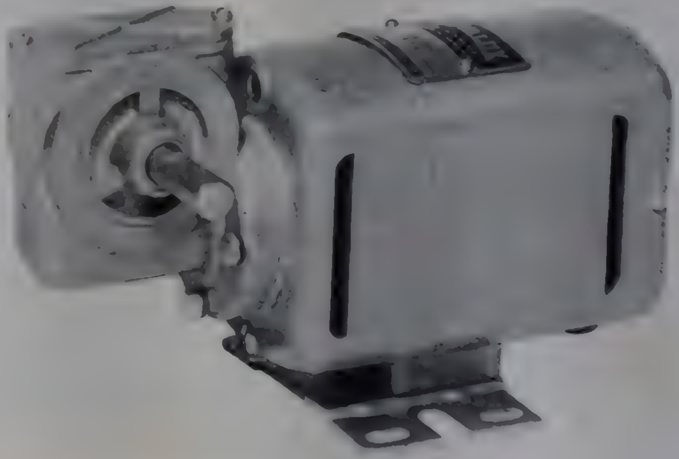
Both ranges Each **£17. 0. 0.** c

When ordering universal motors please specify speed range required.

MX-550



MX-560



MX-606

ACCESSORIES

MX-720 **PULLEYS,** aluminium, with two V grooves. To fit $\frac{1}{4}$ in diameter shafts.

Size No.	1	2
Diameter of V grooves	1 and $1\frac{1}{2}$	$1\frac{1}{2}$ and $2\frac{3}{8}$ in
Each	**10/–**	**11/6** c

MX-721 **PULLEYS** as MX-720, but to fit $\frac{3}{8}$ in diameter shafts.

Size No.	1	2
Diameter of V grooves	1 and $1\frac{1}{2}$	$1\frac{1}{2}$ and $2\frac{3}{8}$ in
Each	**10/–**	**11/6** c

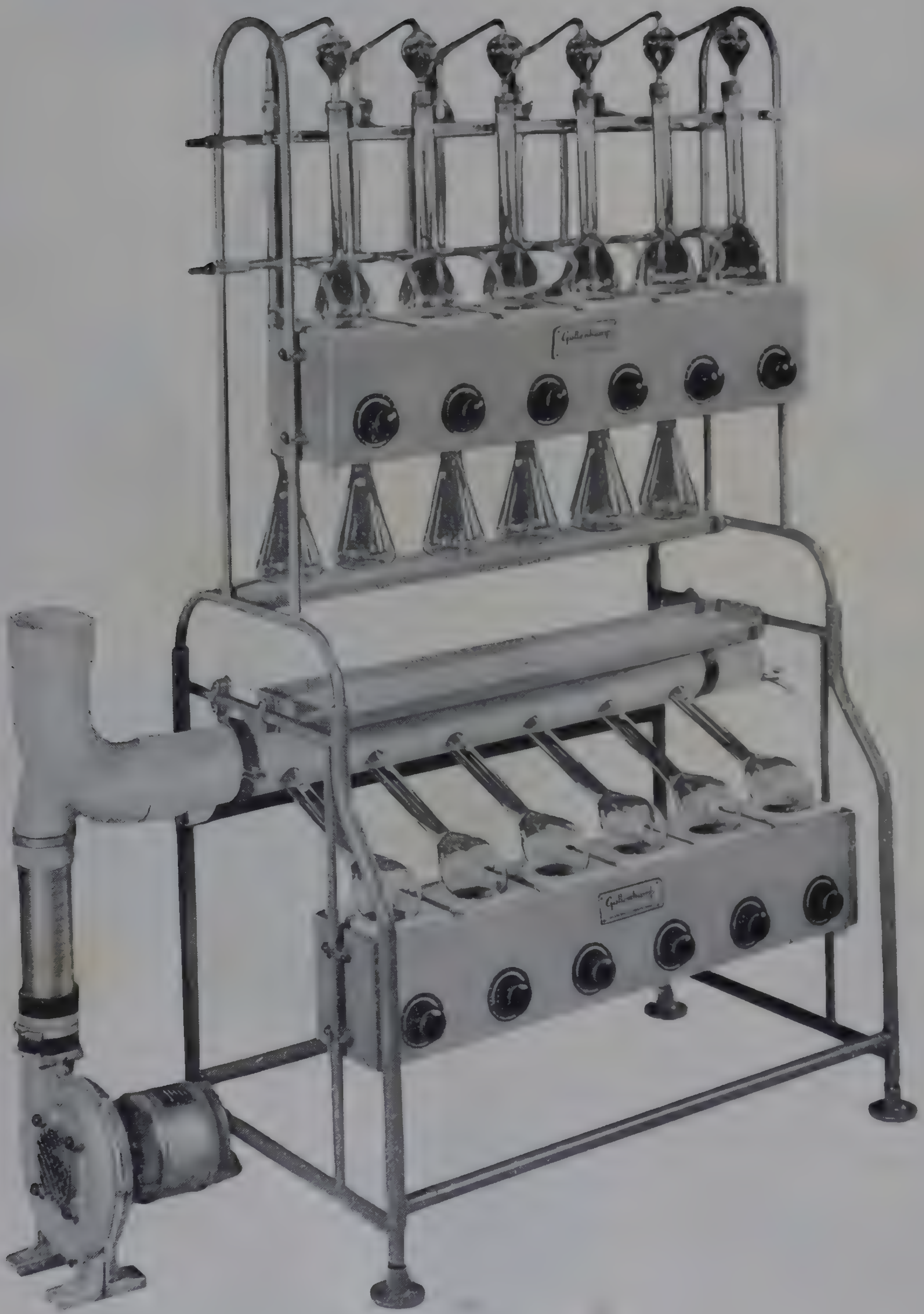
MX-760 **BELTING, nylon braided,** diameter 3 mm. Comprises rubber core covered with nylon braiding impregnated with synthetic rubber. These circular cross section, endless belts provide the necessary elasticity for driving with the right degree of tension, prevent slipping and save wear on bearings as the tension is low and unaffected by changes in humidity.

Length	75	100 cm
Each	**3/3**	**3/3** c

Items on this page normally available from stock except those coded *N.*

Gallenkamp UNIVERSAL KJELDAHL EQUIPMENT

This range of equipment for determination of nitrogen by the Kjeldahl method comprises a versatile series of interchangeable components which can be assembled in many ways to meet individual requirements. The units are based on a bank of 6 tests and can be extended in multiples of 6 as required.



Typical arrangement of *Gallenkamp* universal Kjeldahl equipment arranged for electric heating and permitting simultaneous digestion of 6 samples and distillation of 6 further samples.

HEATERS

Three alternatives are available, all of which can be used for digestion or distillation.

NR-080	Electric with individual energy regulator controls, suitable for flasks 300 to 1000 ml.
NR-090	Gas with individual tap controls, suitable for flasks 300 to 800 ml.
NR-100	Electric heating mantles with individual energy regulator controls, suitable for flasks 100 to 500 ml.

STANDS

For **digestion** purposes three alternatives are available.

The simplest, for use in a fume cupboard, comprises flask rest NR-022 on support rods NR-094 mounted on the ends of a heater unit.

For open bench use the above can be supplied together with vapour tube stand NR-010. (Assembly No. 1, on next page).

For permanent installations NR-020 is recommended. For **distillation** purposes NR-030 is used. (Assembly No. 2, on next page). This may be stood on a bench or mounted on top of the digestion stand NR-020 for combined digestion and distillation. (Assembly No. 3, on next page).

CONDENSERS

These may be individually jacketed Liebig condensers or a single cooling tank may be used. In either case the inner tubes may be of glass or monel metal with ends bent to suit upward or downward sloping stillheads. When individual condensers are used rack NR-036 provides support combined with water inlet and outlet manifolds.

FUME EXTRACTION

A comprehensive range of components fabricated in rigid PVC enables the assembly of an ejector extraction system to suit any location.

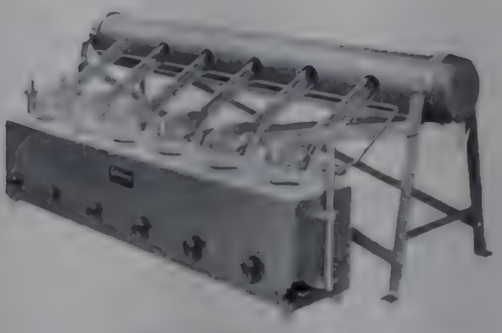
Gallenkamp UNIVERSAL KJELDAHL EQUIPMENT

SPECIMEN ASSEMBLIES

ASSEMBLY No. 1 for DIGESTION

NR-080	1 × Heater, electric.
NR-094	2 × Support rods.
NR-022	1 × Flask rest.
NR-010	1 × Vapour tube bench stand.
NR-120	1 × Vapour tube.
NR-124	1 × End cap.
NR-174	Welding solution.
FJ-160	6 × Kjeldahl flasks, *Pyrex brand* glass.

Note: Vapour tube terminates in a socket which fits PVC trunking system, see NR-160 et seq. in List No. sequence.

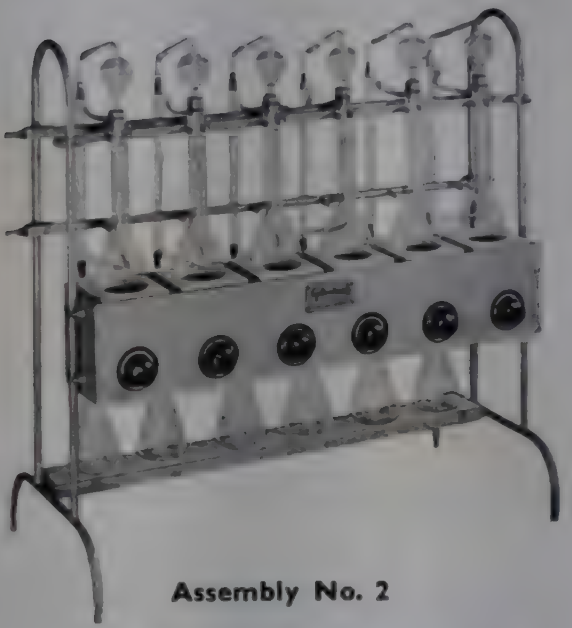

Assembly No. 1

ASSEMBLY No. 2 for DISTILLATION

NR-080	1 × Heater, electric.
NR-030	1 × Distillation stand.
NR-032	1 × Flask holder.
NR-036	1 × Condenser rack.
FJ-160	6 × Kjeldahl flasks, *Pyrex brand* glass.
SU-760	6 × Rubber stoppers, to be drilled 10 mm hole, size as follows:

Flask size	300	500	800	1000 ml
Stopper size No.	23	29	29	29

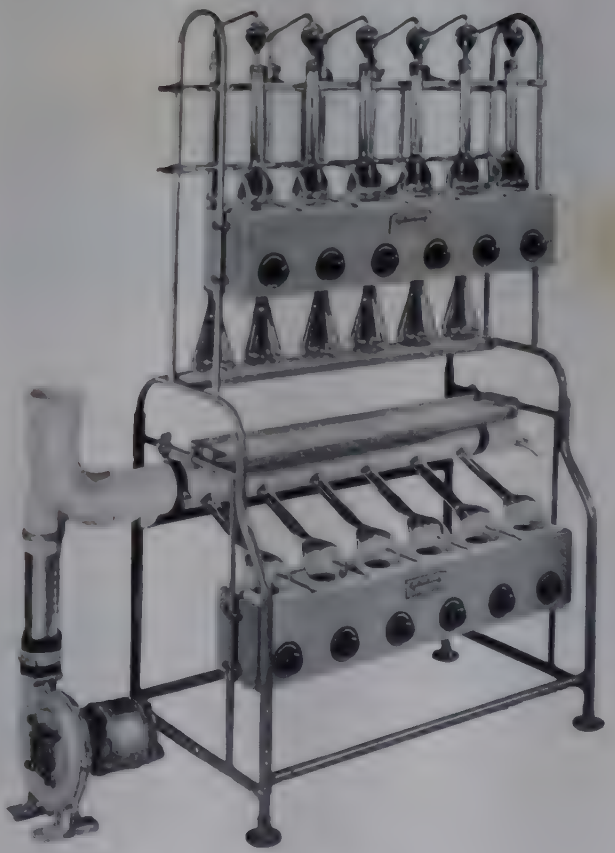
NR-200	6 × Splash heads.
NR-210	6 × Condensers.
NR-224	6 × Safety bulbs.
FJ-050	6 × Conical flasks, *Pyrex brand* glass.


Assembly No. 2

ASSEMBLY No. 3 DIGESTION AND DISTILLATION

Complete with fan and fume ejector unit suitable for an ejection path of up to 600 cm (20 ft) either straight or with one bend. The ejector unit terminates in a socket which fits PVC trunking; see NR-160 et seq. in List No. sequence.

NR-080	2 × Heaters, electric.
NR-020	1 × Floor stand.
NR-030	1 × Distillation stand.
NR-032	1 × Flask holder.
NR-036	1 × Condenser rack.
FJ-160	12 × Kjeldahl flasks, *Pyrex brand* glass.
SU-760	6 × Rubber stoppers, sizes as listed for assembly 2 above.
NR-200	6 × Splash heads.
NR-210	6 × Condensers.
NR-224	6 × Safety bulbs.
FJ-050	6 × Conical flasks, *Pyrex brand* glass.
NR-120	1 × Vapour tube.
NR-124	1 × End cap.
NR-132	1 × Ejector unit.
NR-174	Welding solution for joining above three items.
NR-140	1 × Fan.
NR-144	18 in. Flexible metallic tubing.
NR-146	1 × Connecting sleeve.
NR-148	2 × Hose clips.

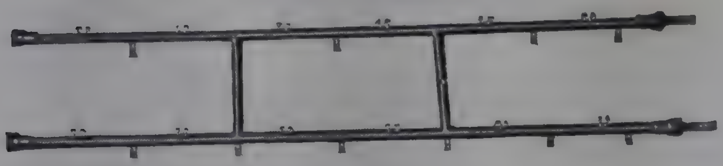

Assembly No. 3

Gallenkamp UNIVERSAL KJELDAHL EQUIPMENT

STANDS AND FITTINGS

NR-010

NR-022



NR-036

NR-040

NR-042
NR-044

NR-043
NR-045

NR-010
BENCH STAND, for mounting vapour tube NR-120 at a centre distance of about 40 cm above the bench top. Made from rust-proofed steel finished in stoved grey enamel. Each **£11. 5. 0.** *b*

NR-020
FLOOR STAND, for *Gallenkamp* 6-test digestion unit and for supporting distillation assemblies mounted on stand NR-030. Tubular steel construction finished in stoved grey enamel, with rubber lined shelf to support the receiving flasks. Overall dimensions 100 × 60 × 77 cm high (see illustration on previous page). Each **£38. 0. 0.** *b*

NR-022
FLASK REST, for use with heaters NR-080, NR-090 and NR-100 to form a simple digestion unit which may be used in a fume cupboard. Made from stainless steel crimped to support flask necks and fitted with clamps to fit stand NR-020 or support rods NR-094. Each **£3.18. 0.** *b*

NR-030
DISTILLATION STAND, for *Gallenkamp* Kjeldahl distillation unit, constructed of strong tubular steel to take heaters NR-080, NR-090 and NR-100, flask holder NR-032, condenser rack NR-036 and condenser tank NR-040. A rubber lined shelf is fitted to take 500 ml conical receiving flasks. The flasks may be lowered at the end of the distillation process for draining the condenser tubes. The stand is rust-proofed and finished in stoved grey enamel. Overall dimensions 97 × 43 × 107 cm high (see previous page for illustration). Each **£13.10. 0.** *b*

NR-032
FLASK HOLDER, for *Gallenkamp* Kjeldahl distillation unit, comprising a bar with six spring clips to grip the necks of distillation flasks. The holder clamps to stand NR-030.

To take flasks	300/500	800/1000 ml	
Each	**84/-**	**88/-**	*b*

NR-036
CONDENSER RACK, for *Gallenkamp* Kjeldahl distillation unit, constructed of tubular copper with spring clips suitable to take 30 cm Liebig condensers NR-210 and NR-212. The horizontal tubes of the rack form the water supply and waste pipes and are fitted with corrugated nozzles for rubber tubing connections to the six condensers which operate in parallel for equal efficiency ... ... Each **£20. 0. 0.** *b*

NR-040
CONDENSER COOLING TANK, for *Gallenkamp* Kjeldahl distillation unit to clamp to stand NR-030. Comprises a stoved grey enamelled copper tank with tubulures at top and bottom into which six monel metal or glass condenser tubes may be fitted using rubber stoppers NR-041. The tank is narrow in order that the water entering at one end flows rapidly through to the outlet and efficiently cool the condenser tubes. Dimensions 92 × 5 × 30 cm in high. **Without condenser tubes or stoppers...** ... ... Each **£31. 0. 0.** *b*

ACCESSORIES

NR-041	**Stopper,** rubber, to fit tubulures of above tank and bored to take condenser tube.	Dozen £0.18. 0.	Each £0. 3. 1.	*b*
NR-042	**Condenser tube,** monel metal, with downward sloping limb ...	Dozen £42. 0. 0.	Each £3.16. 0.	*b*
NR-043	**Condenser tube,** monel metal, with upward sloping limb ...	Dozen £42. 0. 0.	Each £3.16. 0.	*b*
NR-044	**Condenser tube,** glass, downward sloping limb.	Dozen £1. 3. 0.	Each £0. 3. 6.	*e*
NR-045	**Condenser tube,** glass upward sloping limb.	Dozen £1. 3. 0.	Each £0. 3. 6.	*e*

All items on this page normally available from stock.

Gallenkamp UNIVERSAL KJELDAHL EQUIPMENT

6-TESTS HEATER UNITS

The *Gallenkamp* electric and gas units and the *Electrothermal* electric unit have similar fittings by which they can be suspended on stands NR-020 or NR-030. When used as free-standing units, a pair of support rods NR-094 may be attached to the *Gallenkamp* heater units for fitting flask rest NR-022. The *Electrothermal* heater unit is supplied with a pair of support rods and a flask rest. Overall width of each unit is 97 cm.

NR-080

HEATER UNIT, *Gallenkamp*, electric, consisting of six nickel-chromium spiral elements on fireclay formers mounted in an enamelled steel case. The elements have good thermal insulation and each has a replaceable asbestolite cover for supporting a flask. The heaters are individually controlled by energy regulators. **Supplied with asbestolite covers NR-086, for flasks size 500 ml unless otherwise specified. Without support rods or flask rest.** Maximum load 3 kW.

For 220/240V a.c. single phase supplies.	Each **£54. 0. 0.**	*b*
For 200/210V a.c. single phase supplies.	Each **£54. 0. 0.**	*bN*
For 110/120V a.c. single phase supplies.	Each **£54. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

NR-080 with NR-094 and NR-022

REPLACEMENT PARTS AND ACCESSORIES

NR-086 **Asbestolite covers.**

Flask size	300	500	800/1000 ml	
Set of 6	72/–	72/–	72/–	*b*

NR-088 **Heating element, 500W** ... ... Each £1. 3. 0. *b*

NR-094 **Support rod.** See entry below.

When ordering replacement parts please specify serial number of unit and nature of electrical supply.

NR-090

HEATER UNIT, *Gallenkamp*, gas, consisting of a bank of six burners with individual control taps mounted inside a stove enamelled steel case. Each burner is surrounded by heat insulating material and is supplied with a dished rust resistant iron wire gauze cover. **For operation on town (coal) gas** ... ... Each **£37. 0. 0.** *b*

Burners for other industrial gases can be supplied to order.

NR-090 with NR-094 and NR-022

REPLACEMENT PART

NR-092 **Wire gauze cover** ... ... Pack of 6 £2. 4. 0. *b*

ACCESSORIES

NR-094 **Support rods,** for holding flask rest NR-022. Pair £0. 13. 3. *b*

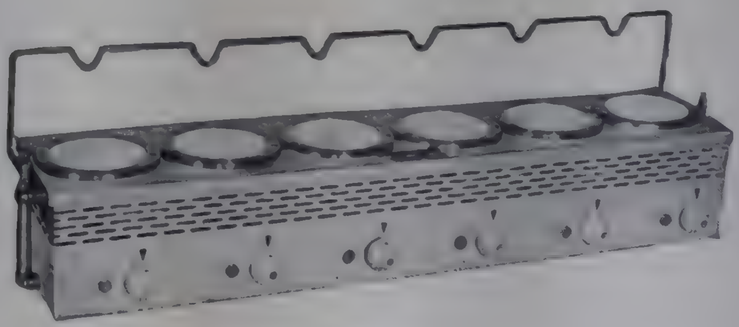
NR-022 **Flask rest.** For details and price see entry in List No. sequence.

NR-100

HEATER UNIT, *Electrothermal*, electric. Consists of a bank of six heating mantles mounted in an aluminium case. Each heater is controlled by an energy regulator and there is an indicator light for each circuit. With support rods and flask rest. For 100/120, 200/220 or 230/250V a.c. single phase supplies.

Ref. No.	MQ3866	MQ3877
Flask sizes	100/300	500 ml
Maximum load	1·8	2·7 kW
Each	**£84. 0. 0.**	**£99. 0. 0.** *mN*

When ordering please state voltage and nature of supply.



NR-100

Items on this page normally available from stock except those coded *N*.

Gallenkamp UNIVERSAL KJELDAHL EQUIPMENT

FUME EXTRACTION

Small numbers of digestions may be carried out in a fume cupboard using a heater bank and flask rest. This method is not recommended for more than occasional use because of the risk of sulphuric acid fumes causing damage to the heater and fume extraction system.

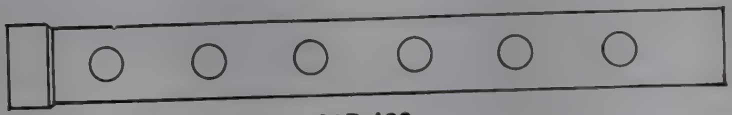
A fume extraction system fabricated in rigid PVC is available for routine work and may be installed in any laboratory.

The fumes are extracted by an ejector and exhausted outside the building through PVC trunking.

All components are listed separately so that a selection can be made to suit any particular location. The vapour tube, end cap, and ejector unit can be assembled either way round to provide exhaust on left or right.

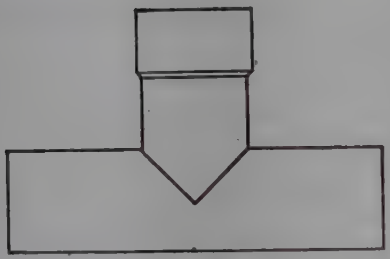
Socket ends are of a size to fit accurately over plain ends. Temporary joints may be made with a smear of grease. Permanent joints are made by painting both components with welding solution and pushing them together.

NOTE: This type of installation is suitable for an ejection path of up to 20 ft (600 cm), either straight or with one bend. We will be pleased to offer ejection systems for more complex situations on receipt of full details and dimensioned sketch of site.



NR-120

NR-124



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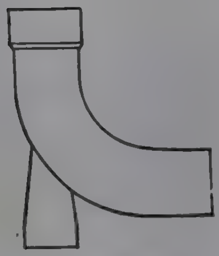
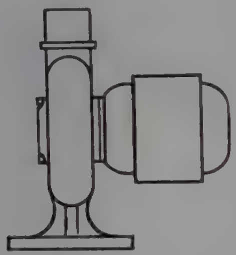
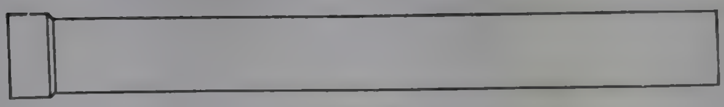


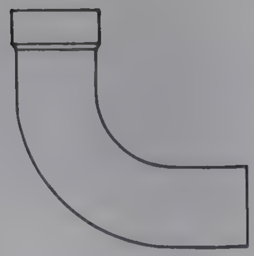
NR-132



NR-140



NR-160



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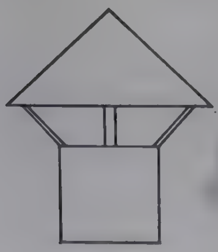


NR-170

NR-120
VAPOUR TUBE, PVC, 4 in (10 cm) internal diameter, overall length 3 ft 6 in, with six holes to take necks of digestion flasks up to 1000 ml capacity. Socket at one end for fixing to ejector ... ... Each **£6. 0. 0.** *b*

NR-124
END CAP, PVC, with draintube, to fit vapour tube NR-120 ... ... Each **£4. 0. 0.** *b*

NR-128
T-TUBE, PVC, with socket on central limb, for central fume extraction from two vapour tubes NR-120. Each **£4. 18. 0.** *b*

NR-132
EJECTOR UNIT, PVC, all-welded construction, capable of efficient fume extraction from up to two vapour tubes NR-120 connected in series or parallel. Requires fan NR-140, flexible metallic tubing NR-144, sleeves NR-146 and clips NR-148 ... Each **£13. 10. 0.** *b*

NR-140
FAN, 9 in (23 cm) diameter, with integral $\frac{1}{16}$ hp induction motor and condenser switch. For 200/250V 50 Hz single phase supplies. Suitable for ejection path not exceeding 600 cm (see Note above) ... ... Each **£33. 12. 6.** *m*

NR-144
FLEXIBLE METALLIC TUBING, 3 in (7·5 cm) diameter, for connecting fan NR-140 to ejector unit NR-132. **Without rubber connecting sleeves or hose clips** ... ... Per ft **£0. 10. 0.** *c*

NOTE: Fan on floor to ejector unit on stand NR-010 on 3 ft bench requires 3 ft (92 cm). Fan to ejector unit on stand NR-020 requires 1 ft 6 in (46 cm).

NR-146
CONNECTING SLEEVE, canvas lined rubber, for connecting NR-144 to fan NR-140 and ejector NR-132. Each **£0. 5. 6.** *c*

NR-148
HOSE CLIPS, for above. Set of 2 **£0. 5. 6.** *c*

NR-160
TUBES, PVC, 4 in (10 cm) internal diameter, with socket at one end.

Length overall	3	5 ft	
Each	**55/–**	**76/–**	*b*

NR-164
ELBOW, PVC, 90°, with socket at one end. Each **£6. 10. 0.** *b*

NR-170
COWL, PVC ... ... Each **£6. 15. 0.** *b*

NR-174
WELDING SOLUTION, sufficient for ten joints, in tin containing $\frac{1}{2}$ pint ... ... Per tin **£0. 12. 9.** *c*

All items on this page normally available from stock.

(AG) BENCHBLOWN GLASSWARE
FOR NITROGEN DETERMINATION

SPECIMEN ASSEMBLIES

The specimen assemblies of Kjeldahl glassware illustrated are suitable for use with *Gallenkamp* Universal Kjeldahl Equipment and show two of the many combinations possible by selection from the glassware listed below. Assembly A is the arrangement adopted in BLWA Specification TCD 143A. Possible alternatives include Kjeldahl or boiling flask, with or without tap funnel, splash head sloping up or down with condenser to correspond.

NR-200
SPLASH HEAD, Kjeldahl type, (AG), borosilicate glass, to BLWA specification TCD 141. Length of side tube 15 cm, sloping downwards.
Dozen **£5.16. 0.** Each **£0.10. 6.** *a*

NR-204
SPLASH HEAD, (AG), as NR-200 but with side tube sloping upwards.
Dozen **£5.16. 0.** Each **£0.10. 6.** *a*

NR-210
CONDENSER, Liebig type, (AG), borosilicate glass, comprising inner tube with end bent up to match splash head NR-200 and 30 cm long jacket attached by rubber tubing ... ... Dozen **£5. 4. 0.** Each **£0. 9. 6.** *a*

NR-212
CONDENSER, (AG), as NR-210 but with inner tube bent down to match splash head NR-204.
Dozen **£5. 4. 0.** Each **£0. 9. 6.** *a*

REPLACEMENT PARTS

NR-044	**Inner tube, for NR-212**	**For prices see entries in List No. sequence.**
NR-045	**Inner tube, for NR-210**	

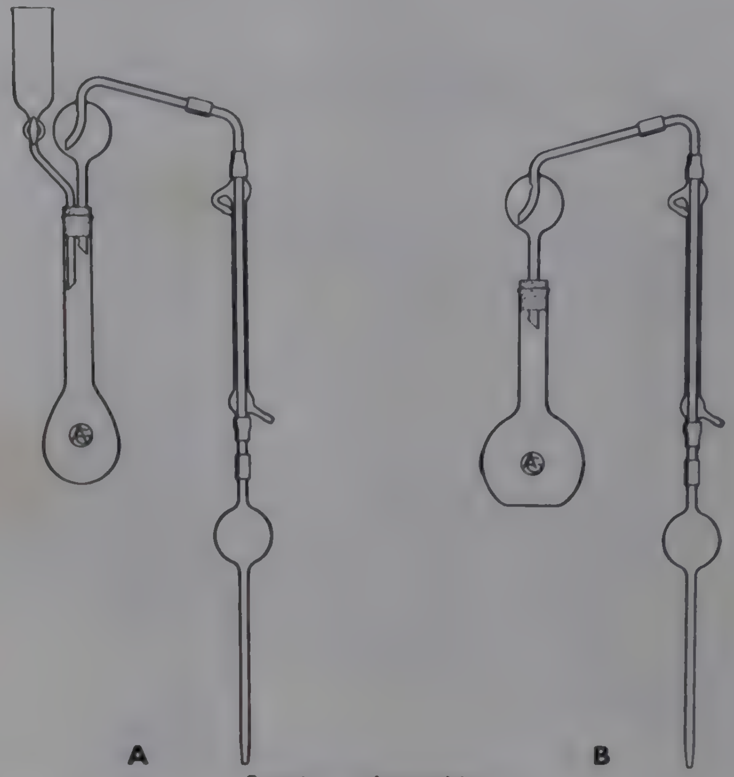
NR-220
TAP FUNNEL, (AG), cylindrical dropping, open top, 100 ml, with stem bent to clear splash head.
Dozen **£7.15. 0.** Each **£0.14. 0.** *a*

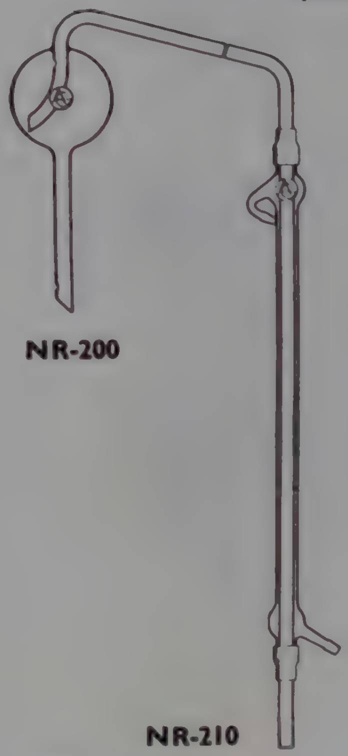
NR-224
SAFETY BULB ABSORBER TUBE, (AG), for use with 500 ml conical flasks.
Dozen **£1.19. 0.** Each **£0. 4. 8.** *a*

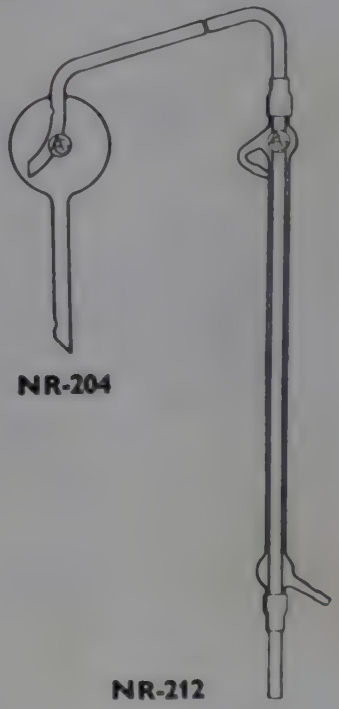
NR-230
BULB STOPPER, (AG), for Kjeldahl flasks.
Dozen **£0.17. 0.** Each **£0. 3. 0.** *a*

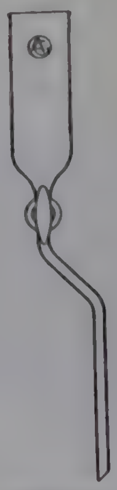
Flasks for use in Kjeldahl determinations

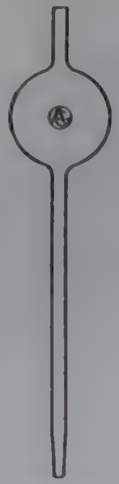
KJELDAHL FLASKS	300 to 800 ml see FJ-160	For details and prices see entries in List No. sequence.
ROUND BOTTOM FLASKS	500 and 1000 ml see FJ-010 to FJ-016	
CONICAL FLASKS	500 ml see FJ-050 to FJ-056	

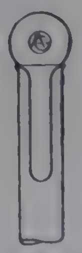

A B
Specimen Assemblies


NR-200
NR-210


NR-204
NR-212


NR-220

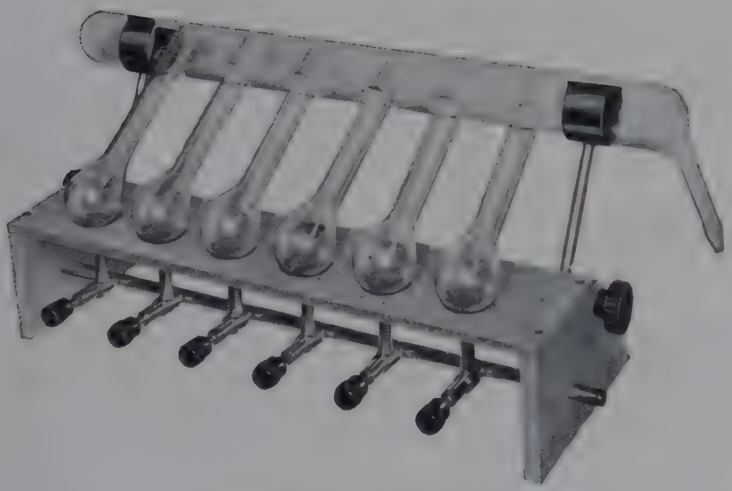

NR-224


NR-230

All items on this page normally available from stock.

Gallenkamp MICRO-KJELDAHL APPARATUS

NR-410 with exhaust tube and flasks



NR-420 with exhaust tube and flasks

NR-510

DIGESTION STANDS

NR-410

DIGESTION STAND, MICRO-KJELDAHL, *Gallenkamp*, electrically heated, to hold six 30 ml digestion flasks FJ-170. Constructed of sheet metal with asbestolite ends. The heating unit is made of asbestolite, and heating is by open nickel-chromium spirals designed so that each flask receives the same heat input. Adjustable spring clips are fitted to support a glass vapour tube NR-450. For 220/240V a.c. single phase or d.c. supplies.

Without glass parts ... ... Each **£28. 10. 0.** *b*

Also available for other voltages to order.

REPLACEMENT PART

NR-412 Heating element ... ... Each £0. 12. 0. *b*

NR-420

DIGESTION STAND, MICRO-KJELDAHL, *Gallenkamp*, gas heated, to hold six 30 ml digestion flasks FJ-170. The stand is constructed in asbestolite and has six positions with centre distances of 55 mm. The burner tube has six micro gas jets with individual control valves. Spring clips on adjustable arms support the vapour tube. Supplied with six wire gauzes but **without flasks or exhaust tube. For town (coal) gas.** Each **£8. 5. 0.** *b*

REPLACEMENT PART

NR-422 Wire gauze ... ... Dozen £0. 3. 0. *b*

NR-450

EXHAUST TUBE, borosilicate glass, to BS 1428 Part B1 with six holes at centre distances of 55 mm, and tubulure for pump connection.

Dozen **£14. 15. 0.** Each **£1. 7. 0.** *a*

NR-452

EXHAUST TUBE, as NR-450 but with larger holes to conform with BS 1428 Part B3.

Dozen **£17. 0. 0.** Each **£1. 11. 0.** *a*

KING TYPE MICRO-KJELDAHL DIGESTION STAND

An electrically heated micro-Kjeldahl digestion stand described by King[†] and used for organic phosphorus and other acid digestions. The stand may be used also for total base and many other determinations, using either digestion flasks, test tubes, crucibles or dual purpose digestion/centrifuge tubes NR-530, where a variable and easily controlled arrangement is desirable.

DESIGN

The stand will hold twenty-four test tubes up to 150×19 mm, with a minimum length of 75 mm. The tubes rest against a stainless steel wire support. The heating elements are open nickel-chromium spirals in fireclay formers, mounted on asbestos boards which are contained in a sheet metal frame.

There are two heaters which heat the bottom and sides of the tubes, respectively. Switches controlling both elements give gentle bottom heat with high top heat to drive off water without refluxing, gentle bottom and top heat and finally full bottom heat to complete the digestion.

NR-510

DIGESTION STAND, MICRO-KJELDAHL, *Gallenkamp*, as specification, for 220/240V a.c. single phase or d.c. supplies ... ... Each **£28. 10. 0.** *b*

Also available for other voltages to order.

REPLACEMENT PART

NR-512 Heating elements, set of two ... Set £0. 15. 6. b

When ordering please state voltage and nature of supply.

NR-530

TUBES, digestion/centrifuge,[†] borosilicate glass, 110 mm×16·5 mm o.d. with constriction approximately 19 mm from bottom. For ultra-micro-Kjeldahl-Nessler determination of nitrogen in protein. The same tube is used for both centrifuging and digestion.

Dozen **£0. 18. 6.** Each **£0. 3. 2.** *a*

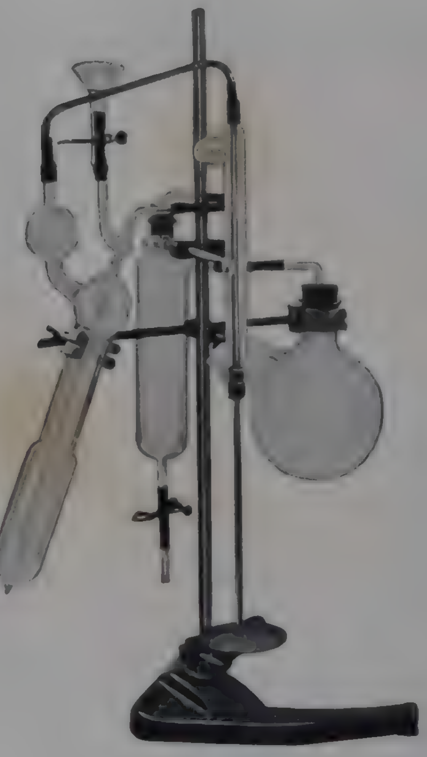
[†] King and Wootton, "Micro-Analysis in Medical Biochemistry". 3rd Ed., p. 17, Churchill, London.

All items on this page normally available from stock.

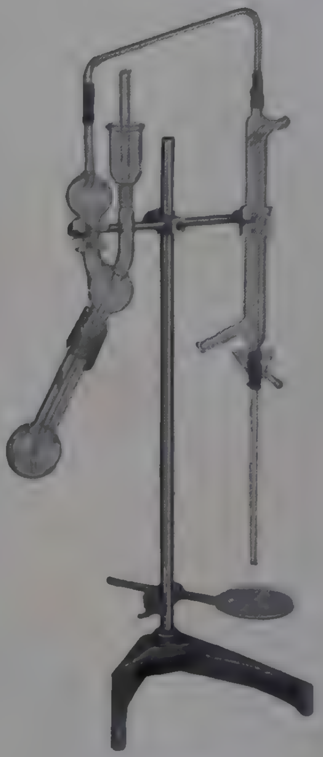
AG MICRO-KJELDAHL DISTILLATION APPARATUS

To BS 1428 Part B1 with Parnas-Wagner automatic discharge arrangement. The digestion products are introduced into the vacuum jacketed distillation vessel, treated with alkaline reagents and steam distilled. Steam is generated in the bolthead flask. The ammoniacal distillate is led through the splash head and condenser into a flask containing suitable absorbent solution. At the end of the distillation, removal of the heat source from the steam generator causes a partial vacuum in the system which transfers the contents of the distillation vessel into the cylindrical waste receiver leaving the distillation vessel empty for the next test.

The components of the apparatus are mounted on a 60 cm retort stand by means of plastics covered spring clips.



NR-650



NR-660

NR-650

DISTILLATION APPARATUS, micro-Kjeldahl, with automatic discharge, AG borosilicate glass, to BS 1428 Part B1, and as specification ... ... Each **£22. 2. 6.** *b*

REPLACEMENT PARTS

NR-652	**Distillation flask,** with vacuum jacket	Each	£3. 6. 0.	*a*
NR-653	**Receiver,** cylindrical	Each	£0.16. 6.	*a*
NR-654	**Condenser jacket**	Each	£0.10. 0.	*a*
NR-655	**Condenser tube,** silver	Each	£8. 0. 0.	*m*
NR-656	**Condenser funnel**	Each	£0. 8. 9.	*a*
NR-657	**Sample funnel,** 50 mm dia. ...	Each	£0. 7. 6.	*a*
NR-658	**Steam generating flask,** 1 litre ...	Each	£0.12. 6.	*a*

Suitable **100 ml conical flask** to receive distillate see FJ-050 to FJ-056 in List No. sequence.

To BS 1428 Part B3, non-transference pattern. The same flask is used for digestion and distillation. After digestion, the products are diluted and the flask assembled to the stillhead. Alkaline reagents are added through the funnel, the air inlet tube inserted and the flask heated while air is bubbled through its contents. The ammonia and water vapour are led through the splash-head and condenser into a receiver flask. To terminate the test the heat source and air inlet tube are removed.

The apparatus is mounted on a 45 cm retort stand using plastics covered spring clips.

NR-660

DISTILLATION APPARATUS, non-transference micro- Kjeldahl, AG borosilicate glass, to BS 1428 Part B3 and as specification ... ... Each **£12. 0. 0.** *b*

REPLACEMENT PARTS

NR-662	**Digestion flask,** with 19/26 socket.	Each	£0.14. 7.	*a*
NR-663	**Stillhead,** with 19/26 cone and 10/19 socket.	Each	£2. 9. 0.	*a*
NR-664	**Inlet tube,** with 10/19 cone ...	Each	£0. 6. 0.	*a*
NR-665	**Condenser tube,** borosilicate glass.	Each	£0. 4. 5.	*a*

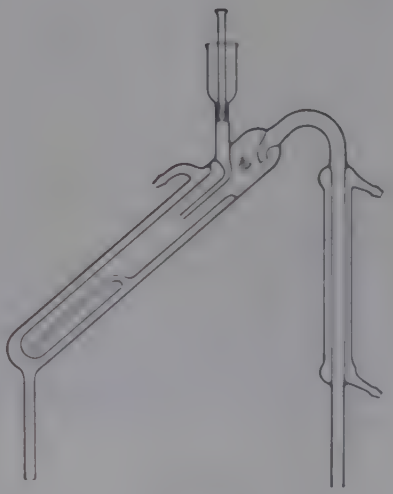
The condenser jacket, condenser funnel and **receiver flasks** are identical to those for NR-650, For prices and details see entries above.

ACCESSORY

AF-400 **Air pump** suitable for use with NR-660. For price and details see entry in List No. sequence.

NOTES. Condenser tubes NR-655 and NR-665 are interchangeable and thus provide a choice of silver or glass on either distillation assembly.

Apparatus NR-660 can be used with a steam generator as NR-658 if desired, instead of using an air supply, but this procedure does not comply with BS 1428 Part B3.



NR-680

NR-680

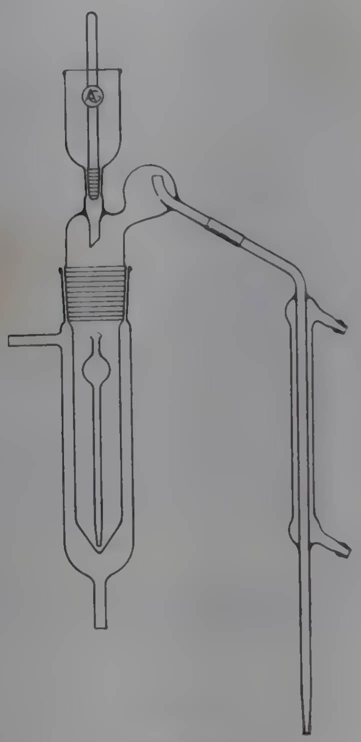
DISTILLATION APPARATUS, ultra-micro-Kjeldahl, AG Markham pattern, borosilicate glass. Designed for use in biochemical work on quantities of distillate up to 2 ml. One piece assembly with 7/11 stopper. Each **£4.14. 0.** *a*

MARKHAM apparatus for micro-Kjeldahl determination see **QUICKFIT APPARATUS.**

All items on this page normally available from stock.

(AG) MICRO-KJELDAHL DISTILLATION APPARATUS

†HOSKINS MICRO-KJELDAHL DISTILLATION APPARATUS



NR-690

For convenient and precise distillations with 40 or 80 ml samples. The apparatus incorporates a steam condensation-suction device for the automatic removal of the sample thereby enabling successive determinations to be made very rapidly.

The apparatus comprises an outer tube with 50/42 socket, steam entry sidearm and drain tube: two alternative inner tubes with 50/42 cone, splash head, funnel with 10/19 socket for peg stopper and a narrow jacket condenser.

†Reference. Hoskins, Analyst **69**, 1944, 271.

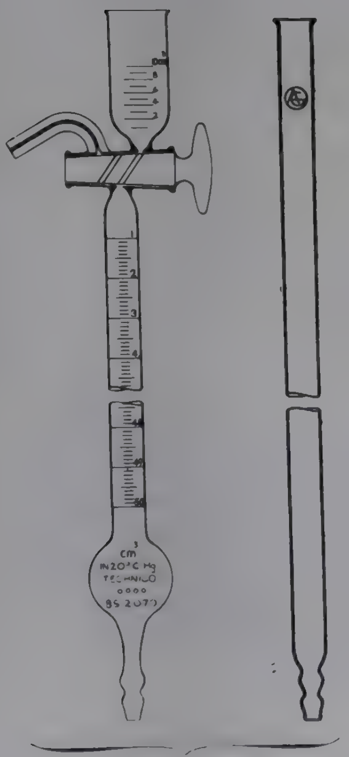
NR-690
MICRO-KJELDAHL DISTILLATION APPARATUS, Hoskins, (AG), all borosilicate glass, as specification, with macro inner tube (80 ml) ... Each **£5. 14. 0.** *a*

NR-691
MICRO-KJELDAHL DISTILLATION APPARATUS, Hoskins, (AG), as above but with micro inner tube (40 ml) ... ... Each **£5. 10. 0.** *a*

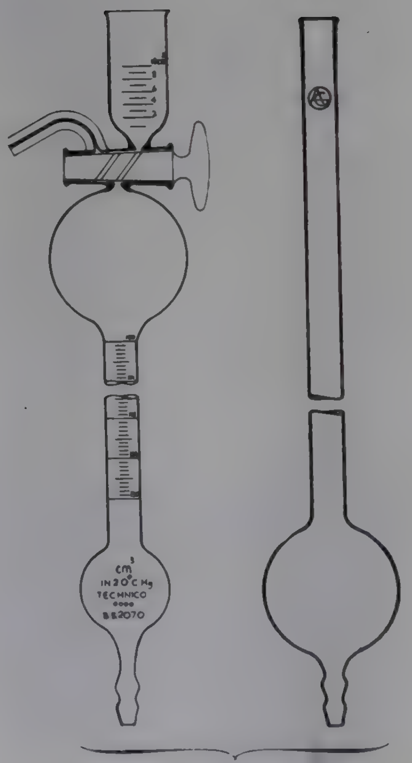
COMPONENTS

NR-692	**Main glass part, macro,** comprising inner tube, splash-head and funnel (without stopper). Working capacity about 80 ml, with 50/42 cone ...	Each	**£3. 8. 0.**	*a*
NR-693	**Main glass part, micro,** as above but working capacity about 40 ml	Each	**£3. 4. 0.**	*a*
NR-704	**Outer vessel,** with 50/42 socket ...	Each	**£1. 7. 0.**	*a*
NR-705	**Condenser**	Each	**£0. 14. 0.**	*a*
NR-709	**Peg stopper,** cone 10/19 for funnel.	Each	**£0. 5. 6.**	*a*

NITROMETERS



NT-040



NT-060

NT-040
NITROMETER, Lunge†, borosilicate glass, to BS 2070. Comprises measuring tube graduated 1 to 50 cm³ in 0·1 cm³, with a double oblique bore stopcock and 10 cm³ cup graduated in 2 cm³. With plain levelling tube.
Set **£3. 4. 0.** *a*

†Lunge and Ambler 'Technical Gas Analysis', p. 371.

NT-060
NITROMETER, Lunge, borosilicate glass, to BS 2070, particularly suitable for nitrocellulose and nitroglycerine determinations. Comprises measuring tube graduated from 100 to 130 cm³ in 0·1 cm³ with a 100 cm³ bulb surmounted by a double oblique bore stopcock and a 10 cm³ cup graduated in 2 cm³. With plain levelling tube.
Set **£3. 18. 0.** *a*

All items on this page normally available from stock.

Gallenkamp CALIBRATING OIL BATHS

MAXIMUM TEMPERATURE 200°C

For comparisons of Thermometers, Thermocouples and other similar applications.

- **Manually controlled model for steadily changing temperature**
- **Thermostatically controlled model for constant or changing temperatures**
- **Temperature variation only ±0·25°C**

OPERATION

The bath is heated by a double, tubular immersion heater rated at 250 and 1250W, of which the latter portion is used solely as a boost heater. The heating and cooling rates for the manually controlled model are:—

Temperature of bath	50°C	200°C
Heating rate (250W heater)	1°C/min	0·4°C/min
Cooling rate	0·05°C/min	0·5°C/min

Time to heat from 20° to 200°C (with boost heater) 40 min.

When the bath is stirred, temperature variation over 20 cm diameter and 23 cm depth is only ±0·25°C.

If it is necessary to adjust the heating and cooling rates a variable transformer ED-601 may be incorporated into the 250W heater circuit.

DESIGN

The bath is a welded cylindrical tank which is of cadmium plated steel. There is glass wool insulation and a heat break between the tank and the casing. A plain removable top cover is supplied as standard, but this can be drilled to suit individual requirements, provided details are specified at time of ordering. The support rod at the back of the casing is for mounting a stirrer motor.

A 3-pin socket and plug for connecting the stirrer motor are fitted and the bath is supplied with a mains connecting cable.

A Thermostatically Controlled Model is available for making comparisons at constant temperatures in addition to the steadily rising or falling temperatures obtained with the standard apparatus. The modified bath is fitted with an adjustable contact thermometer, an electronic relay and a stirrer. Temperature fluctuation is within 0·2°C.

DIMENSIONS

Inner tank	30 cm deep, 20 cm dia.
Outer casing	35×28×28 cm
Capacity	9 litres

OD-050

OIL BATH, calibrating, *Gallenkamp*, as specification, **manually controlled.** With plain removable cover but **without stirrer.** For a.c. single phase supplies.

For 220/240V	Each	**£55. 0. 0.**	*b*
For 200/210V	Each	**£55. 0. 0.**	*bN*
For 110/120V	Each	**£56. 0. 0.**	*bN*

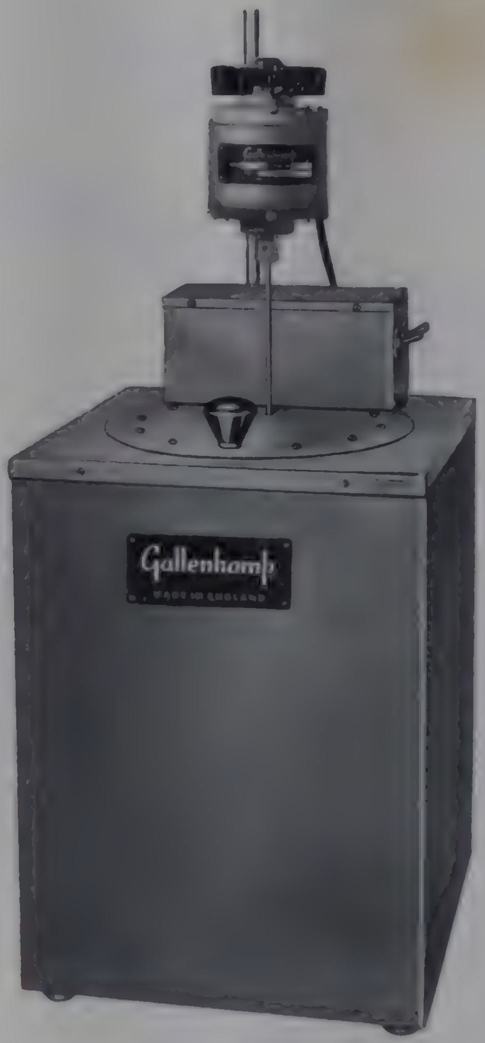
When ordering tubulures in the lid, please state details. An additional charge is made for this modification.

OD-051

OIL BATH, calibrating, *Gallenkamp*, as OD-050 but **thermostatically controlled.** Fitted with Handilab stirrer, contact thermometer range 0–200°C and electronic relay. For a.c. single phase supplies.

For 220/240V	Each	**£113. 0. 0.**	*b*
For 200/210V	Each	**£113. 0. 0.**	*bN*
For 110/120V	Each	**£114. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.



OD-050 with SS-425 and SS-548

REPLACEMENT PARTS AND ACCESSORIES

OD-052	**Immersion heater**... ... ... Each **£6. 15. 0.**	*b*
ED-601	**Transformer,** *Variac*, enclosed type for 240V a.c.	
OD-150	**Oil,** for filling bath.	
SM-610	**Bosshead,** *Technico*.	
SS-425	**Stirrer Handilab.**	
SS-455	**Chuck,** for fitting SS-548 to stirrer SS-425.	
SS-548	**Flexible stirring rotor,** with 46 cm stainless steel shaft.	
TM-480	**Contact thermometer,** for OD-051, range 0–200°C. For details and prices of the above see entries in List No. sequence.	

When ordering replacement parts please state serial number of bath and supply voltage.

Items on this page normally available from stock except those coded *N*.

Gallenkamp THERMOSTATIC OIL BATHS

MAXIMUM TEMPERATURE 200°C

For a wide range of applications such as oxidation stability tests on oils and greases and as a heating source in extractions and distillations and any work requiring close temperature control.

- **Two sizes available**
- **Temperature fluctuation within 0·5°C**

OD-110

DESIGN

The baths are strongly constructed in steel throughout with a rectangular welded inner tank with the durable black matt finish obtained by the Parkerizing process. The large floor area is strong enough to support heavy objects.

DIMENSIONS

Size	1	2	
Overall, excluding control box	50×42×29	65×48×39	cm
Internal	39×30×23	55×38×30	cm
Working space	28×30×20	43×38×28	cm
Capacity	27	60	litres
Maximum power rating	2	3·5	kW

OPERATION

All controls are mounted in the control box which bridges one end of the bath, leaving a maximum of space free from obstruction.

Each bath is heated by two independently switched tubular immersion heaters rated according to the size of the bath.

One heater in each bath is used as a boost heater.

The thermostat, which is mounted in the control box, operates in conjunction with a hotwire relay. A powerful shaded pole motor, also fitted into the control box, drives a stirring rotor attached to a flexible stainless steel shaft.

Heating rates

Size 1 20° to 200°C in 80 min
Size 2 20° to 200°C in 110 min
(no overshoot occurs with either size).

Temperature variation

Both sizes within ±0·5°C throughout the working space.

Temperature fluctuation

Both sizes within 0·5°C.

OD-110

OIL BATHS, thermostatic, *Gallenkamp*, electrically heated, as specification. For a.c. single phase supplies.

Size		1	2	
For 220/240V	Each	**£88.10. 0.**	**£103. 0. 0.**	*b*
For 200/210V	Each	**£88.10. 0.**	**£103. 0. 0.**	*bN*
For 110/120V	Each	**£92.10. 0.**	**£105. 0. 0.**	*bN*

When ordering please state voltage and nature of supply

REPLACEMENT PARTS

OD-120	**Immersion heater, 1000W for size 1.**	Each	**£4. 4. 0.**	*b*
OD-121	**Immersion heater, 1500W for size 2.**	Each	**£4. 5. 0.**	*b*
OD-122	**Boost heater, 1000W for size 1** ...	Each	**£4. 5. 0.**	*b*
OD-123	**Boost heater, 2000W for size 2** ...	Each	**£5.10. 0.**	*b*
OD-124	**Stirrer motor, for both sizes** ...	Each	**£5. 0. 0.**	c

When ordering replacement parts please state serial number of bath and supply voltage.

ACCESSORIES

OD-150 **Oil,** opaque, with viscosity characteristics suitable for use in above oil baths, between 50 and 200°C. Flash point 232°C. In 5 gallon (22·5 litres) non-returnable drum. Each **£4.12. 0.** c

AU-445 **Stopcock, polythene suitable for above oil drum** ... ...
LX-110 **Lubricant, suitable for motor bearings** ... ...
For details and prices see entries in List No. sequence.

Items on this page normally available from stock except those coded *N.*

OPTICAL BENCHES

OP-070

OPTICAL BENCH, 100 cm long, uncalibrated. A triangular section grooved to accept saddle stands OP-071. Complete with levelling feet but **without accessories** ... ... Each **£8. 0. 0.** *f*

ACCESSORIES

OP-071	**Saddle stand,** width of base 60 mm, height of stem 60 mm...	Each **£1. 16. 0.**	*f*

NOTE: Each accessory listed below requires a saddle stand OP-071 before it can be mounted on the bench OP-070.

OP-073

OPTICAL BENCH OUTFIT, comprising bench OP-070, 6× saddles OP-071, 1 off each accessories OP-080 to OP-104 and clear glass hollow 60° prism with removable lid ... ... Each **£76. 12. 6.** *fN*

For additional accessories see OP-080 to OP-104 in List No. sequence.

OP-075

OPTICAL BENCH, precision, 200 cm long with scale calibrated in mm. Comprises a flat cast iron bed machined to accept saddles OP-076 and OP-077. **Without accessories** ... ... Each **£64. 0. 0.** *fN*

ACCESSORIES

OP-076	**Saddle stand,** with vernier reading to 0·1 mm.	Each **£3. 7. 6.**	*fN*
OP-077	**Saddle stand,** with vernier reading to 0·1 mm and transverse and vertical adjustment ...	Each **£10. 5. 0.**	*fN*

NOTE: Each accessory listed below requires a saddle stand OP-076 or OP-077 before it can be mounted on the bench OP-075.

ACCESSORIES

OP-080	**Table,** 100 mm diameter	Each **£1. 5. 0.**	*f*
OP-082	**Stage plate,** with rotary movement.	Each **£3. 12. 6.**	*f*
OP-084	**Lens holder,** sliding grip, for lenses up to 50 mm diameter	Each **£1. 7. 6.**	*f*
OP-086	**Lens holder,** sliding grip, for lenses from 10 to 100 mm diameter	Each **£1. 10. 0.**	*f*
OP-088	**Rotary stops**	Each **£4. 17. 6.**	*f*
OP-090	**Iris diaphragm,** 40 mm full aperture.	Each **£3. 12. 6.**	*f*
OP-092	**Projection lens,** 10 cm focus ...	Each **£9. 5. 0.**	*f*
OP-094	**Vee support,** for mounting microscope OP-096 and telescope OP-098 on saddle ...	Each **£1. 15. 0.**	*f*
OP-096	**Microscope,** with Ramsden eyepiece and glass crossline graticule. Working distance 5 cm, magnification ×20. Requires Vee support OP-094 ...	Each **£9. 5. 0.**	*f*
OP-098	**Telescope,** with Ramsden eyepiece and glass crossline graticule. Working distance approx. 90 cm to infinity, magnification ×8. Requires Vee support OP-094.	Each **£9. 5. 0.**	*f*
OP-100	**Screen holder,** with clips to hold glass screens.	Each **£2. 2. 6.**	*f*
OP-102	**Optical slit**	Each **£5. 0. 0.**	*f*
OP-104	**Clip,** for holding paper	Each **£0. 14. 0.**	*f*

For suitable light source see lamps.

OP-070 with OP-071

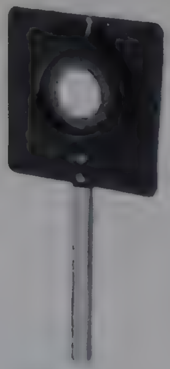
OP-075 with OP-076

OP-080

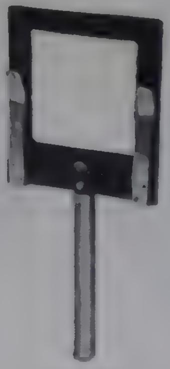
OP-082

OP-084

OP-088

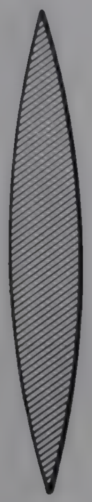

OP-090

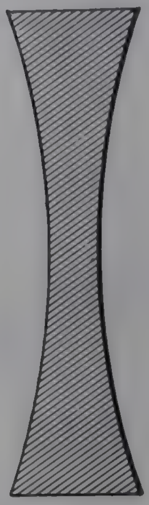
OP-092

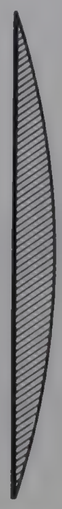

OP-100

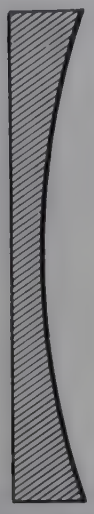
OP-102

Items on this page normally available from stock except those coded *N.*


OP-120


OP-122


OP-124


OP-126

LENSES

OP-120

LENSES, biconvex, optically worked glass, with moulded edges. Refractive index $\mu_D=1\cdot52$ approx. Diameter 50 mm.

Focal length	10	15	20	30	50 cm	
Dozen	**82/–**	**70/–**	**66/–**	**57/–**	**51/–**	c
Each	**7/10**	**7/–**	**6/8**	**6/–**	**5/8**	

OP-122

LENSES, biconcave, optically worked glass, with moulded edges. Refractive index $\mu_D=1\cdot52$ approx. Diameter 50 mm.

Focal length	10	15	20	30	50 cm	
Dozen	**114/–**	**94/–**	**80/–**	**72/–**	**70/–**	c
Each	**10/3**	**8/9**	**7/10**	**7/2**	**7/–**	

OP-124

LENSES, plano-convex, optically worked glass, with moulded edges. Diameter 50 mm.

Focal length	16·6	20	28·5 cm	
Dozen	**175/–**	**175/–**	**175/–**	c
Each	**16/–**	**16/–**	**16/–**	

OP-126

LENSES, plano-concave, optically worked glass, with moulded edges. Diameter 50 mm.

Focal length	16·6	20	28·5 cm	
Dozen	**175/–**	**175/–**	**175/–**	c
Each	**16/–**	**16/–**	**16/–**	

OP-140

OP-142

LENS ACCESSORIES

OP-140

LENS HOLDER, polished wood, on base with a V-slot to accommodate lenses OP-120 to OP-126.

Dozen **£2. 15. 0.** Each **£0. 5. 10.** c

OP-142

LENS HOLDER, brass, to accommodate lenses OP-120 to OP-126 ... Dozen **£0. 13. 6.** Each **£0. 2. 9.** c

OP-160

LENS GAUGE, watch form, for measuring the dioptric power of curved surfaces from −15 D to +15 D on two scales. Equivalent focal length scale 6·6 cm convex to 6·6 cm concave. Chromium plated case with side finger grips, Perspex cover and three pins, one being used for zero adjustment. With protective cap.

Each **£2. 5. 0.** m

GJ-250

SPHEROMETER for measuring curvature of lenses see entry in List No. sequence.

THE
BERWICK
LENS MEASURE
Made by
Gowllands
England
OP-160

GJ-250

All items on this page normally available from stock.

MIRRORS

OP-180

MIRRORS, plane, unmounted, with silvered back. Thickness 3 mm.

Dimensions	75×25	150×25 mm	
Dozen	**14/9**	**19/6**	c

OP-182

MIRRORS, convex, optically worked glass, with silvered back, unmounted. Diameter 75 mm.

Focal length	7·5	15	30	50 cm	
Dozen	**165/–**	**118/–**	**90/–**	**90/–**	m
Each	**15/–**	**10/9**	**8/6**	**8/6**	

OP-184

MIRRORS, concave, optically worked glass, with silvered back, unmounted. Diameter 75 mm.

Focal length	7·5	15	30	50 cm	
Dozen	**165/–**	**118/–**	**90/–**	**90/–**	m
Each	**15/–**	**10/9**	**8/6**	**8/6**	

PRISMS

OP-230

PRISMS, optically worked **Crown glass,** equilateral, 60–60–60°, refractive index $\mu_D=1{\cdot}52$.

Length of side	25	32 mm	
Dozen	**260/–**	**285/–**	c
Each	**23/6**	**26/–**	

OP-232

PRISMS, optically worked **Crown glass,** isosceles, 45–45–90°, refractive index $\mu_D=1{\cdot}52$.

Length of side	25	32 mm	
Dozen	**235/–**	**285/–**	c
Each	**21/6**	**26/–**	

OP-234

PRISMS, optically worked **dense flint glass,** equilateral, 60–60–60°, refractive index $\mu_D=1{\cdot}62$.

Length of side	25	32 mm	
Dozen	**310/–**	**410/–**	c
Each	**28/–**	**37/–**	

POLAROID

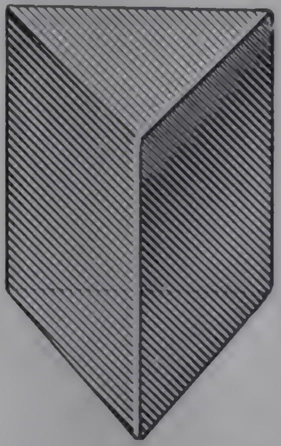
OP-300

POLAROID SHEET, flexible plastics, 7·5 cm square, for laboratory experiments and demonstrations, giving a high and uniform degree of polarisation. The squares can be trimmed easily with scissors or a sharp blade.
Each **£0. 13. 6.** m

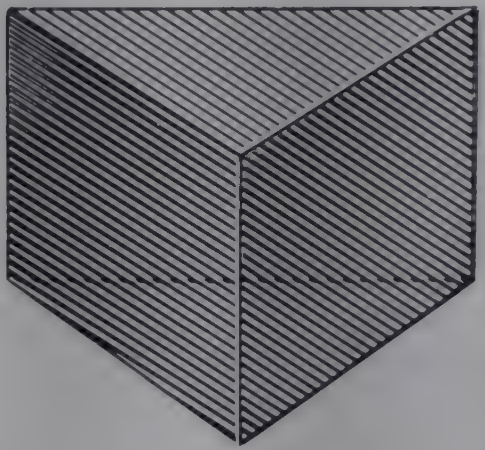
OP-320

POLAROID FILTER, mounted between plane glass disks of 45 mm diameter, for applications where a high optical quality is required, giving a uniform degree of polarisation ... ... Each **£2. 5. 0.** m

Other size squares and other diameter disks are available, details and prices on application.



OP-230
OP-234



OP-232

OPTICAL INSTRUMENTS

for educational, industrial and research purposes will be found under the following headings:

CATHETOMETERS
COLORIMETERS
LAMPS
LASERS
MAGNIFIERS
MICROSCOPES
POLARIMETERS
PROJECTORS
REFRACTOMETERS
SPECTROMETERS
SPECTROPHOTOMETERS
SPECTROSCOPES

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for standard packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'dozen' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about 50/0d. per dozen.

This system is intended to encourage ordering in standard packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

All items on this page normally available from stock.

Gallenkamp LABORATORY AND INDUSTRIAL OVENS

CONTENTS

	Page
Hotbox oven/sterilisers, 200°C	554
Economy ovens, 200°C	555
BS ovens, 250°C	556
Heavy duty BS ovens, 300°C	559
Large capacity oven/steriliser, 250°C	560
Moisture extraction oven, 250°C	561
Moderate conditions humidity oven	562
Humidity oven	564
Drying cabinet	569
Vacuum ovens	570

Gallenkamp HOTBOX OVEN/STERILISERS, 200°C

Economically priced, wide shelved ovens for general laboratory use including drying and sterilising.

Gallenkamp
Hotbox

OV-010 Size 2

- **Control by direct reading thermostat**
- **Welded steel exterior**
- **Aluminium interior—large shelf areas**
- **Both sizes accommodate pipette sterilising boxes SR-800**

OV-010

OVEN/STERILISERS, HOTBOX, *Gallenkamp*, 200°C, as specification, with hydraulic thermostat, load indicator lamp, shelves and sheathed heater. For single phase a.c. supplies.

Size No.		1	2	
For 220/240V	Each	£42. 0. 0.	£55. 0. 0.	*b*
For 200/210V	Each	£42. 0. 0.	£55. 0. 0.	*bN*
For 110/120V	Each	£42. 0. 0.	£55. 0. 0.	*bN*

When ordering please state voltage and nature of supply.

PERFORMANCE (definitions see p. 561)

Size No.	1	2	
Temperature fluctuation	2	2	°C
Time to heat to 200°C	30	30	min
Power rating max.	500	750	W
Shelves			
Number supplied	2	3	
Number of positions	4	6	
Dimensions	48 × 30	48 × 40	cm
	19 × 11½	19 × 16	in

DIMENSIONS

	H W D	H W D	
Internal	33 × 48 × 33	48 × 48 × 43	cm
	13 × 19 × 13	18½ × 19 × 17	in
Overall	57 × 59 × 48	70 × 58 × 58	cm
	22 × 23 × 19	27½ × 23 × 23	in
Weight, net	23	25	kg
	50	54	lb

REPLACEMENT PART

OV-012 **Heating element.**

Size No.	1	2	
Each	£2. 0. 0.	£2. 0. 0.	*b*

When ordering replacement electrical parts please state Serial No. of oven and voltage and nature of supply.

ACCESSORIES

OV-014 **Extra shelf.**

Size No.	1	2	
Each	£1. 6. 0.	£1. 6. 0.	*b*

LB-150	**Labels,** sterile	For details and prices see entries in List No. sequence.
SR-800	**Sterilizing boxes**	
TJ-050	**Thermometer,** scale span 0 to 250°C	
TJ-170	**Thermometers,** scale span 50 to 110°C and 150 to 210°C	

For suitable **FLOOR STAND** see **OV-482** in **Addenda.**

Items on this page normally available from stock except those coded *N*.

Gallenkamp ECONOMY OVENS, 200°C
WITH *Compenstat* CONTROL

For general work requiring stability over long periods, these ovens combine the reliable performance of the *Compenstat* with a simplicity of design and economy of price.

- ***Compenstat* direct reading thermostat**
- **Wide shelves**
- **Adjustable ventilator**
- **Insulated metal or toughened plate glass doors**

OV-060

DESIGN

The light grey enamelled steel exterior encloses an efficiently lagged aluminium interior with fixed shelf runners. The shelves are perforated aluminium sheets, flanged front and rear. A metal sheathed heater is fitted outside the bottom of the oven liner Controls comprise the *Compenstat*, scaled 30 to 200°C, the load indicator lamp and the mains ON/OFF switch.

Two alternative doors are offered—an insulated metal door with asbestos gasket or a plate glass door with sprung phosphor bronze sealing strip. **The oven with glass door has a maximum working temperature of 160°C.** Both doors have fitted nameplates with pockets for test record cards.

PERFORMANCE (definitions see p. 561)

Temperature fluctuation less than 1°C at all temperatures

Time to heat to 200°C	45 min
Power rating max.	650 W
Shelves	
Number supplied	2
Number of positions	4
Dimensions	35·5×29 cm 14 ×11½ in

DIMENSIONS

	H		W		D
Internal	28	×	38	×	30 cm
	11	×	15	×	12 in
Overall	53	×	51	×	43 cm
	21	×	20	×	17 in
Weight, net	24 kg				
	52 lb				

For suitable **FLOOR STAND** see **OV-480** in **Addenda.**

OV-060

OVEN, ECONOMY, *Gallenkamp*, 200°C, as specification **with metal door,** *Compenstat* direct reading thermostat, load indicator lamp, mains switch, shelves, sheathed heater and adjustable ventilator. For single phase a.c. supplies.

For 220/240V	Each **£58. 0. 0.**	*b*
For 200/210V	Each **£58. 0. 0.**	*bN*
For 110/210V	Each **£58. 0. 0.**	*bN*

OV-062

OVEN, ECONOMY, *Gallenkamp*, 160°C, as specification and OV-060 **but with toughened plate glass door.** For single phase a.c. supplies.

For 220/240V	Each **£58. 10. 0.**	*b*
For 200/210V	Each **£58. 10. 0.**	*bN*
For 110/120V	Each **£58. 10. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PART

OV-066	**Heater,** 650W	Each **£3. 12. 0.**	*b*

When ordering replacement electrical parts please state Serial No. of oven and voltage and nature of supply.

ACCESSORIES

OV-068	**Shelf**	Each **£1. 7. 6.**	*b*
TJ-050	**Thermometer,** scale span 0 to 250°C in 1°C. For full details and price see entry in List No. sequence.		

Items on this page normally available from stock except those coded *N*.

Gallenkamp BS OVENS, 250°C

TO BS 2648 and BS 3421

WITH Compenstat CONTROL

Modern heating, drying and sterilising ovens, scientifically designed to conform to the performance requirements of BS 2648 for electrically heated laboratory ovens and BS 3421 for electrically heated sterilising ovens.

Full details see following pages.

- **Accurate temperature control by direct reading Compenstat**
- **Coupled safety thermostat for additional protection**
- **Available in three sizes up to 210 litres (7·5 ft^3) capacity**
- **Fan convection ensures temperature uniformity even at full load**
- **Efficient insulation for cool exterior and operating economy**
- **Unitised control chassis simplifies maintenance and servicing**
- **Recessed panel protects controls from inadvertent alteration**
- **Stainless steel interior designed for easy cleaning**

Gallenkamp BS OVENS

(continued)

DESIGN

Exterior. The exterior of the oven is easily cleaned and is finished in a hard light-grey stoved enamel. The door gasket is of woven glass fibre and the door is provided with a plugged hole for fitting a dial thermometer. The adjustable door catch enables the door to be opened and closed exceptionally easily but, being spring-loaded, holds the door firmly when shut.

Interior. The oven liner is of corrosion resistant, semi-polished stainless steel to BS 971, EN 58B with fixed shelf runners and an easily removable baffle at the rear which guards the fan and heaters. There are no electrical connections within the working space.

Shelves. The 12·5 mm grid steel wire shelves are heavily plated with chromium on nickel in accordance with BS 1224 Grade 1S.

Basket shelves with grid sides 7 cm high are available as optional extras. These are of similar construction and finish to the ordinary shelves and slide directly on to the shelf runners. They are convenient for pre-loading of small articles which can then be inserted quickly into the oven with minimum heat loss.

Heating and Air Circulation. Air drawn from the centre of the oven is recirculated to the top and bottom of the workspace by a rear mounted fan. The heater, which is sheathed in stainless steel, surrounds the fan and is shielded from the workspace by the baffle. The fan motor has bearings which require no lubricating.

Temperature Control. Temperature is accurately and reliably controlled by a direct reading *Compenstat* which is linked to a safety thermostat. The latter is also a *Compenstat* so that, in the event of failure of the main control thermostat, the oven again comes under control a few degrees above the original setting. Under these conditions a warning lamp indicates that the safety thermostat has taken over control. All controls are mounted on a single unitised chassis for complete accessibility when servicing.

Ventilation. An adjustable ventilator in the top of the oven may be closed to prevent airflow or opened to allow air drawn in by the fan to flow through the oven for fume or moisture extraction. The ventilator incorporates a clip to hold a mercury in glass thermometer and may be lifted out to provide a 2·8 cm dia. aperture for cables, tubing, etc. Since there is no air inlet in the base of the oven, the controls and circuits are completely protected from spillage.

PERFORMANCE (definitions see p. 561)

Data when tested to British Standard 2648 'Performance requirements for electrically heated laboratory ovens (unloaded)'.

Size No.	1	2	3	
At 100°C				
Temperature fluctuation	0·5	0·5	0·5	°C
Temperature variation	1·0	1·5	2·0	°C
Heating time to stability	35	45	50	min
Recovery	6	8	7	min
Recovery overshoot	1·0	0	0	°C
Ventilation rate	2000	2000	2000	l/hr
At 250°C				
Temperature fluctuation	0·5	0·5	0·5	°C
Temperature variation	2·5	4·0	6·0	°C
Heating time to stability	50	70	60	min
Recovery	20	20	20	min
Recovery overshoot	0	0	0	°C

Data when tested to British Standard 3421 'Performance of electrically heated sterilising ovens (loaded) at ambient plus 140°C'.

Size No.	1	2	
Temperature drift during 2 hr period	0	0·5	°C
Temperature variation	3·0	4·0	°C
Heating time to stability	135	120	min
Overshoot	0	0	°C

(**Note:** Oven Size No. 3 does not conform with BS 3421. For large capacity oven/sterilizer see OV-420).

DIMENSIONS

Size No.	1 H W D	2 H W D	3 H W D	
Internal	46×40×36	61×51×46	76×61×46	cm
	18×16×14	24×20×18	30×24×18	in
Overall	79×56×66	94×66×76	109×76×76	cm
	31×22×26	37×26×30	43×30×30	in
Shelves				
Size (net usable)	38×34	48×44	58×44	cm
	15×13½	19×17½	23×17½	in
Number supplied	3	3	4	
Number of positions	4	5	6	
Interval between positions	11	11·5	12	cm
	4¼	4½	4¾	in
Basket shelves				
Size, internal	33×33×7	43×43×7	53×43×7	cm
	13×13×2¾	17×17×2¾	21×17×2¾	in
Weight, net	56	78	94	kg
	122	172	206	lb
Power rating, max.	1·0	1·5	2·0	kW

Gallenkamp BS OVENS

(continued)

OV-160

OVENS, BS, *Gallenkamp*, **fan convection, 250°C,** as specification, to BS 2648 (and BS 3421 size Nos. 1 and 2 only). With *Compenstat* direct reading temperature controller and coupled safety thermostat. Fitted with load indicator and safety thermostat takeover indicator lamps. **Without thermometer.** For 50/60 Hz single phase supplies.

Size No.	1	2	3	
For 220/240V	**£95. 0. 0.**	**£115. 0. 0.**	**£155. 0. 0.**	*b*
For 200/210V	**£95. 0. 0.**	**£115. 0. 0.**	**£155. 0. 0.**	*bN*
For 110/120V	**£95. 0. 0.**	**£115. 0. 0.**	**£155. 0. 0.**	*bN*

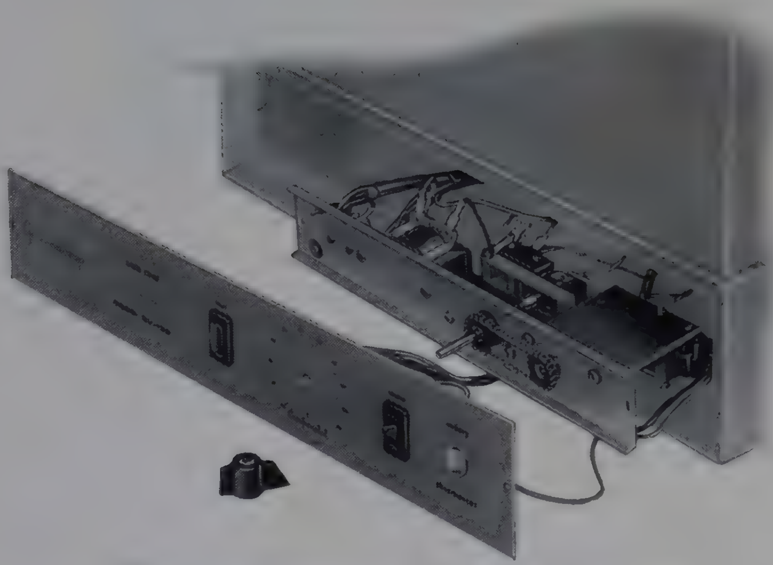
OV-165

OVENS, BS, *Gallenkamp*, as OV-160 but **with double glazed window** 25×25 cm fitted in the door. For 50/60 Hz single phase supplies.

Size No.	1	2	3	
For 220/240V	**£108. 0. 0.**	**£128. 0. 0.**	**£168. 0. 0.**	*b*
For 200/210V	**£108. 0. 0.**	**£128. 0. 0.**	**£168. 0. 0.**	*bN*
For 110/120V	**£108. 0. 0.**	**£128. 0. 0.**	**£168. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

For suitable **FLOOR STANDS** see **OV-480** to **OV-484** in **Addenda.**



View of unitised control panel of a BS oven

NOTE: Throughout the Ovens sections and elsewhere in the catalogue, **maximum power rating** is included in the tabulated data. This rating is the load when the heaters are switched ON by the temperature controller; during OFF periods no power is supplied and the mean power rating over any period of time is a function of the ratio of ON/OFF times.
Ovens must be connected to electricity supply points of sufficient current capacity to carry the maximum power rating otherwise the load during ON periods may cause damage to the mains installation.

REPLACEMENT PARTS

OV-170 **Heaters.**

Oven Size No.	1	2	3	
Each	**60/–**	**60/–**	**60/–**	*b*

OV-172 **Motor, fan** ... ... Each **£4. 18. 0.** c

When ordering replacement electrical parts please state Serial No. of oven and voltage and nature of supply.

OV-174 **Shelves.**

Oven Size No.	1	2	3	
Each	**18/–**	**21/–**	**24/6**	*b*

ACCESSORIES

OV-176

OV-176 **Basket shelves.**

Oven Size No.	1	2	3	
Each	**64/–**	**80/–**	**90/–**	*b*

***OV-178** **Dial temperature indicator, door fitting pattern,** with retaining clip. Range 0–300°C Each **£5. 4. 0.** c

TJ-060 **Thermometer,** range 0 to 250°C, to fit ventilator clip, for general applications ... ...

TJ-170 **Thermometer,** range as selected, to fit ventilator clip, for applications requiring an accurate indication of temperature ... ...

For details and prices see entries in List No. sequence.

Items on this page normally available from stock except those coded *N.*

Gallenkamp HEAVY DUTY BS OVENS, 300°C

With solid state electronic controller and push button preset temperature selection

FOR LABORATORIES AND INDUSTRY

Rugged, high performance ovens designed particularly to accommodate heavy loads and suitable for precision controlled industrial use. Constructed throughout in heavy gauge materials.

- **Solid state temperature control—direct reading, precise**
- **Safety thermostat for additional protection**
- **Conform to the performance requirements of BS 2648 and BS 3421**
- **Fan convection ensures temperature uniformity even at full load**
- **Extra thick insulation for cool exteriors and operating economy**
- **All controls on single recessed panel—fitted temperature indicator**
- **Stainless steel interior designed for easy cleaning**

OV-330

DESIGN

Apart from the information tabulated on this page and the method of temperature control described below, these ovens are similar in design to OV-160 BS Ovens except that they are built of heavier gauge materials, strengthened where necessary, to withstand heavy work loads. For details of heating, air circulation, etc., please refer to description of OV-160.

Temperature Control. Temperature is accurately and reliably controlled by a *Gallenkamp* direct reading solid state electronic controller. This has two continuously variable direct reading temperature scales ranged 40–180°C and 170–300°C. It also has three pre-set controls, two of which are in the range 60–170°C and the third 170–280°C, which can be pre-set by the user to temperatures most commonly required. The range controls and the pre-set controls are selected by push-buttons on the control panel. For additional security of oven contents, a safety thermostat is fitted which, in the event of incorrect setting or failure of the electronic controller, takes over and maintains the oven at a slightly higher temperature (with a larger temperature differential). Under these circumstances a warning lamp indicates that the safety thermostat has taken over control.

PERFORMANCE (definitions see p. 561)

Size No.		1	2	
Temperature fluctuation		0·1	0·1	°C
Temperature variation	at 200°C	2	4	°C
	at 300°C	4	7	°C
Heating time to stability	at 200°C	45	60	min
	at 300°C	60	75	min

DIMENSIONS

Size No.	1 H W D	2 H W D	
External	79×56×66	94×69×78	cm
	31×22×26½	37×27×30½	in
Weight, net	57	79	kg
	124	174	lb
Power rating, max.	1·5	2·0	kW

For internal dimensions and details of shelf positions and shelves, please refer to OV-160 BS Ovens Size Nos. 1 and 2.

Ordering specifications and prices see over.

Gallenkamp HEAVY DUTY BS OVENS

(continued)

OV-330

OVENS, HEAVY DUTY BS, *Gallenkamp,* **fan convection, 300°C,** as specification, to BS 2648 and BS 3421. With direct reading solid state electronic temperature controller and independent safety thermostat. Fitted with load indicator and safety thermostat takeover indicator lamps. For single phase supplies.

Size No.	1	2	
For 220/240V 50 Hz	**£117. 10. 0.**	**£135. 0. 0.**	*b*
For 200/210V 50 Hz	**£117. 10. 0.**	**£135. 0. 0.**	*bN*
For 110/120V 60 Hz	**£117. 10. 0.**	**£135. 0. 0.**	*bN*

OV-335

OVENS, HEAVY DUTY BS, *Gallenkamp,* as OV-330 but **with double glazed window** 25×25 cm fitted in the door. For single phase supplies.

Size No.	1	2	
For 220/240V 50 Hz	**£130. 10. 0.**	**£148. 0. 0.**	*b*
For 200/210V 50 Hz	**£130. 10. 0.**	**£148. 0. 0.**	*bN*
For 110/120V 60 Hz	**£130. 10. 0.**	**£148. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

OV-340 **Heaters.**

Oven Size No.	1	2	
Each	**60/–**	**60/–**	*b*

OV-172	**Motor**	For prices see entries in List No. sequence.
OV-174	**Shelves**	

When ordering replacement electrical parts please state Serial No. of oven and voltage and nature of supply.

For suitable **FLOOR STANDS** see **OV-480** and **OV-482** in Addenda.

ACCESSORIES

OV-176	**Basket shelves**	For details and prices see entries in List No. sequence.
OV-178	**Dial temperature indicator,** door fitting, range 0–300°C ...	
TJ-060	**Thermometer,** range 0 to 360°C, to fit ventilator clip	
TJ-170	**Thermometers,** ranges up to 260°C as selected, to fit ventilator clip	
TJ-260	**Thermometer,** range 245 to 305°C, to fit ventilator clip	

Gallenkamp OVEN/STERILIZER, 250°C

LARGE CAPACITY

WITH *Compenstat* CONTROL

A large capacity modern sterilising oven, scientifically designed to conform to the performance requirements of BS 3421 'Performance of Electrically Heated Sterilising Ovens'.

- **Accurate temperature control by direct reading** *Compenstat*
- **Coupled safety thermostat for additional protection**
- **Capacity 210 litres (7·5 ft³)**
- **Fan convection ensures temperature uniformity even at full load**
- **Stainless steel interior designed for easy cleaning**

Illustration see opposite page.

DESIGN

This oven is similar in design to OV-160 BS Oven Size No. 3 but has been modified to meet the requirements of BS 3421. For details of heating, air circulation, etc., please refer to description of OV-160.

PERFORMANCE when tested to BS 3421 methods at ambient plus 140°C (definitions see page 561).

Temperature drift during 2 hr period	0·5°C
Temperature variation	5 °C
Heating time to stability	120 min
Overshoot on initial heating	0 °C

DIMENSIONS

As OV-160 size No. 3 except:
Power rating, max. 2·5 kW
Weight, net 102 kg (224 lb)

OV-420

OVEN/STERILIZER, large capacity, *Gallenkamp,* **fan convection, 250°C,** as specification, to BS 3421. With *Compenstat* direct reading temperature controller and coupled safety thermostat. Fitted with load indicator and safety thermostat takeover indicator lamps. **Without thermometer.** For 50/60 Hz single phase supplies.

For 220/240V	Each	**£165. 0. 0.**	*b*
For 200/210V	Each	**£165. 0. 0.**	*bN*
For 110/120V	Each	**£165. 0. 0.**	*bN*

OV-425

OVEN/STERILIZER, large capacity, *Gallenkamp,* as OV-420 but **with double glazed window** 25×25 cm fitted in the door. For 50/60 Hz single phase supplies.

For 220/240V	Each	**£178. 0. 0.**	*b*
For 200/210V	Each	**£178. 0. 0.**	*bN*
For 110/120V	Each	**£178. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

For suitable **FLOOR STAND** see **OV-484** in **Addenda.**

REPLACEMENT PARTS AND ACCESSORIES

OV-430	**Heaters**	Each	£2. 15. 0.	*b*

Other replacement parts and accessories as for OV-160 Size No. 3 For prices see entries OV-172 to OV-178 in List No sequence.

When ordering replacement electrical parts please state Serial No. of oven and voltage and nature of supply.

Items on this page normally available from stock except those coded *N.*

Gallenkamp MOISTURE EXTRACTION OVEN, 250°C
LARGE CAPACITY
WITH Compenstat CONTROL

A large capacity modern oven designed for the rapid, even drying of wet bulk laboratory and industrial samples such as sand, vegetable matter, tobacco, wood pulp, paper, etc.

- **Accurate temperature control by direct reading Compenstat**
- **Coupled safety thermostat for additional protection**
- **Capacity 210 litres (7·5 ft³)**
- **Forced ventilation and large heater for rapid moisture extraction**
- **Liner of corrosion resistant stainless steel to BS 971, EN 58B**

OV-420
OV-440

DESIGN

This oven is similar in design to OV-160 BS Oven Size No. 3 but includes a higher powered heater and a mechanical ventilating system to provide rapid throughput of heated air. Provision is made for connecting the air outlet to a duct. For details of heating, air circulation, etc., please refer to description of OV-160. An outlet adapter for 4 in i.d. ducting is supplied with each oven. This may be used to connect the ventilation to a fume and moisture extraction system.

PERFORMANCE—unloaded oven at 110°C (definitions see below).

Temperature fluctuation	1·0 °C
Temperature variation	2·0 °C
Heating time to stability	25 min
Maximum ventilation rate	36,000 l/hr

DIMENSIONS

See OV-160 size No. 3 except.
Power rating, max. 2·5 kW
Weight, net 94 kg (206 lb)

OV-440
OVEN, MOISTURE EXTRACTION, large capacity, *Gallenkamp*, **fan convection and ventilation, 250°C,** as specification. With *Compenstat* direct reading temperature controller, coupled safety thermostat and outlet adapter. Fitted with load indicator and safety thermostat takeover indicator lamps. **Without thermometer.** For 50/60 Hz single phase supplies.

For 220/240V	Each **£185. 0. 0.** *b*
For 200/210V	Each **£185. 0. 0.** *bN*
For 110/120V	Each **£185. 0. 0.** *bN*

OV-445
OVEN, MOISTURE EXTRACTION, large capacity, *Gallenkamp*, as OV-440 but **with double glazed window** 25×25 cm fitted in the door. For 50/60 Hz single phase supplies.

For 220/240V	Each **£198. 0. 0.** *b*
For 200/210V	Each **£198. 0. 0.** *bN*
For 110/120V	Each **£198. 0. 0.** *bN*

When ordering please state voltage and nature of supply.

For suitable **FLOOR STAND** see **OV-484** in **Addenda.**

REPLACEMENT PARTS AND ACCESSORIES

OV-430 **Heaters.** For price see entry in List No. sequence.
Other replacement parts and accessories as for OV-160 Size No. 3. For prices see entries OV-172 to OV-178 in List No. sequence.

When ordering replacement electrical parts please state Serial No. of oven and voltage and nature of supply.

DEFINITIONS OF TERMS

The following terms, defined in BS specifications, are used in the tabulated performance data given for *Gallenkamp* ovens:-

Working space—That portion of the internal space which is above the lowest shelf and not less than 3 cm from any wall (including the roof).

Oven temperature—The temperature at the centre of the working space.

Temperature variation—The difference at any moment between the temperature at the centre of the working space and at any other point in the working space.

Temperature fluctuation—The short term changes in temperature (due to operation of the temperature controller) at any point in the working space.

Recovery—The time taken for an oven to regain temperature within 1°C after the temperature has been reduced from an initial steady state by opening the door fully for one minute.

Recovery overshoot—Any temperature overshoot induced by the procedure described under 'Recovery'.

All other terms used are considered to be self-explanatory.

NOTE: The factor most likely to influence the choice of oven is the size since it is always advisable to have ample capacity for the work in hand. Undue congestion of oven working space invariably leads to loss of performance.

Items on this page normally available from stock except those coded *N*.

Gallenkamp MODERATE CONDITIONS HUMIDITY OVEN

WITH SALT TRAY HUMIDIFIER TO BS 3718 'LABORATORY HUMIDITY OVENS (NON-INJECTION TYPE)'

For conditioning samples prior to electrical, corrosion or weight change tests and for investigations of shelf life under simulated temperate or tropical conditions.

OV-600

PERFORMANCE

The oven accurately produces the conditions of temperature and humidity and the performance required by the British Standard for Humidity Ovens (Non-injection type) BS 3718 and by many other standard specifications including:—

BS 419	Varnished Cotton Cloth for Electrical Purposes.
BS 1133	Section 7. Packaging Code.
BS 2844	Standard Conditions for Testing and Pre-conditioning. (Conditions 1 to 4 inclusive.)

Temperature range ... ... ambient to 50°C.

Humidity range ... 0 to 100% r.h. at temperatures up to 40°C; maximum of 90% r.h. at 50°C.

The temperature and humidity ranges are shown on the accompanying diagram which also lists recommended salts for obtaining certain commonly required relative humidities.

Temperature variation ... ... within ±0·5°C.

Measured with reference to the centre of the oven working space at twelve test points respectively 3 cm in from the corners and centres of the walls of the inner liner.

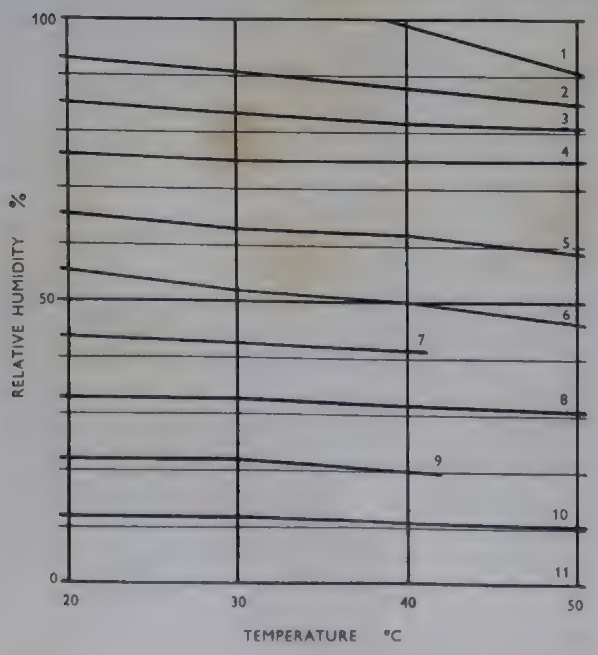
Humidity variation ... ... within ±2% r.h.

Temperature fluctuation ... ... less than 0·5°C.

Recovery time after opening door ... ... 10 min

The time taken for the temperature and relative humidity to regain their initial values to within ±0·5°C and ±2% r.h. after the door has been fully opened for one minute.

TEMPERATURES AND RELATIVE HUMIDITIES NORMALLY ATTAINABLE IN 20°C AMBIENT TEMPERATURE



Material to be placed in tray to obtain indicated values of relative humidity shown in graph on left.

Curve No.	Material
1	Distilled water
2	Potassium nitrate—saturated solution
3	Potassium chloride ,, ,,
4	Sodium chloride ,, ,,
5	Sodium nitrite ,, ,,
6	Sodium dichromate ,, ,,
7	Potassium carbonate ,, ,,
8	Magnesium chloride ,, ,,
9	Potassium acetate ,, ,,
10	Lithium chloride ,, ,,
11	Silica gel—dried.

For details of salts suitable for other relative humidities see Journal of Scientific Instruments **25**, **1948**, **73**.

Gallenkamp MODERATE CONDITIONS HUMIDITY OVEN

(continued)

DESIGN

The oven is efficiently lagged and has an easily removable stainless steel liner which forms air ducts at the top, rear and bottom of the oven. Air is circulated by means of a centrifugal fan mounted on the rear wall.

Temperature control is by means of a 0–50°C contact thermometer connected to a power relay which operates the heater. An inconel sheathed heater mounted round the fan ensures rapid temperature response and minimum fluctuation. When working at or near ambient temperature, cooling is required and may be provided by passing cold water through the built-in cooling coil. The coil is mounted outside the oven liner to prevent condensation forming on it when its temperature is below the oven dew point. An automatic cooling accessory is available and includes a solenoid valve to allow the passage of cooling water alternately with operation of the heater.

Humidity control is based on the fact that the relative humidity of air in contact with salt solutions reaches known equilibrium values at any temperature. The large area salt tray ensures that the atmosphere equilibrates rapidly.

The outer case is steel and the door is fitted with a heated double glazed window 30×30 cm for unimpeded viewing of samples under test. The door closes on to a resilient rubber gasket and all tubulures are sealed in position so that in operation the oven is substantially airtight.

Mains and heater indicator lamps and a main fuse are grouped on an easily removable panel at the front of the oven. The door operated switch for the fan motor and the power relay for the heater are mounted behind the panel.

DIMENSIONS

Shelves

Number supplied	2
Number of positions	3
Interval between positions	12·7 cm 5 in
Dimensions	56·7×46·3 cm $22\frac{5}{16}\times18\frac{1}{4}$ in

Dimensions

	H		W		D	
Internal	53	×	61	×	51	cm
	21	×	24	×	20	in
External	84	×	76	×	87	cm
	33	×	30	×	34	in

Weight, net	88 kg 192 lb
Power rating, max.	350 W
Approximate weight of salt required for salt tray	3 kg

OV-600

HUMIDITY OVEN, MODERATE CONDITIONS, *Gallenkamp*, as specification, with stainless steel liner, nylon coated salt tray, sheathed heater, contact thermometer and built-in cooling coil and two shelves. For single phase supplies.

For 220/240V 50 Hz	Each	£375.	0.	0.	*b*
For 200/210V 50 Hz	Each	£375.	0.	0.	*bN*
For 110/120V 60 Hz	Each	£380.	0.	0.	*bN*

REPLACEMENT PARTS

OV-602	**Heating element**	Each £2. 12. 0.	*b*
OV-604	**Contact thermometer**	Each £12. 0. 0.	*c*
OV-606	**Shelf**	Each £8. 0. 0.	*b*
OV-608	**Fan motor**	Each £22. 10. 0.	*c*
EB-120	**Fuse,** 2A, for 200/240V models	For prices see entries in List No. sequence.	
EB-120	**Fuse,** 5A, for 110/120V models		

ACCESSORIES

OV-610 **Automatic cooling unit,** for use with OV-600 complete with solenoid valve, mounting bracket and instructions for fitting. No extra fitting charge is made if ordered with oven ... ... Each £9. 5. 0. *b*

HV-150 **Hygrometer,** *Gallenkamp*, wet and dry bulb type range 0–50°C. This can be fitted directly on to the oven door so that it is visible through the window. For full details and price see entry in List No. sequence.

BRITISH STANDARDS

The British Standards Institution is the national standardising body of the U.K. The standards which it publishes represent the results of collaboration between a wide range of interests including users, technical and scientific experts and manufacturers.

The BSI maintains close contact with many overseas standardising bodies both by interchange of information and by direct representation through the medium of ISO (International Organisation for Standardisation). Many British Standards, particularly those revised in recent years reflect the influence of international requirements.

Any article made to a British Standard is one on which the purchaser or user can rely as being satisfactory for its intended general use. The BS requirements must be such as will satisfy the majority of users and manufacturers, otherwise the standard will not receive general recognition.

The discerning purchaser will not only require goods made to the appropriate BS but will also recognise that within the framework of a standard a variation of finish and quality is possible and that it is still as important as ever to purchase from a source with a known reputation for high quality.

The name *Gallenkamp* has been known in laboratories throughout the world for more than three quarters of a century. *Gallenkamp* products bearing one of the five registered trade marks, *Gallenkamp*, *Technico*, *Compenstat*, (AG) or *Asda* can be relied upon to provide the highest quality at an economic price.

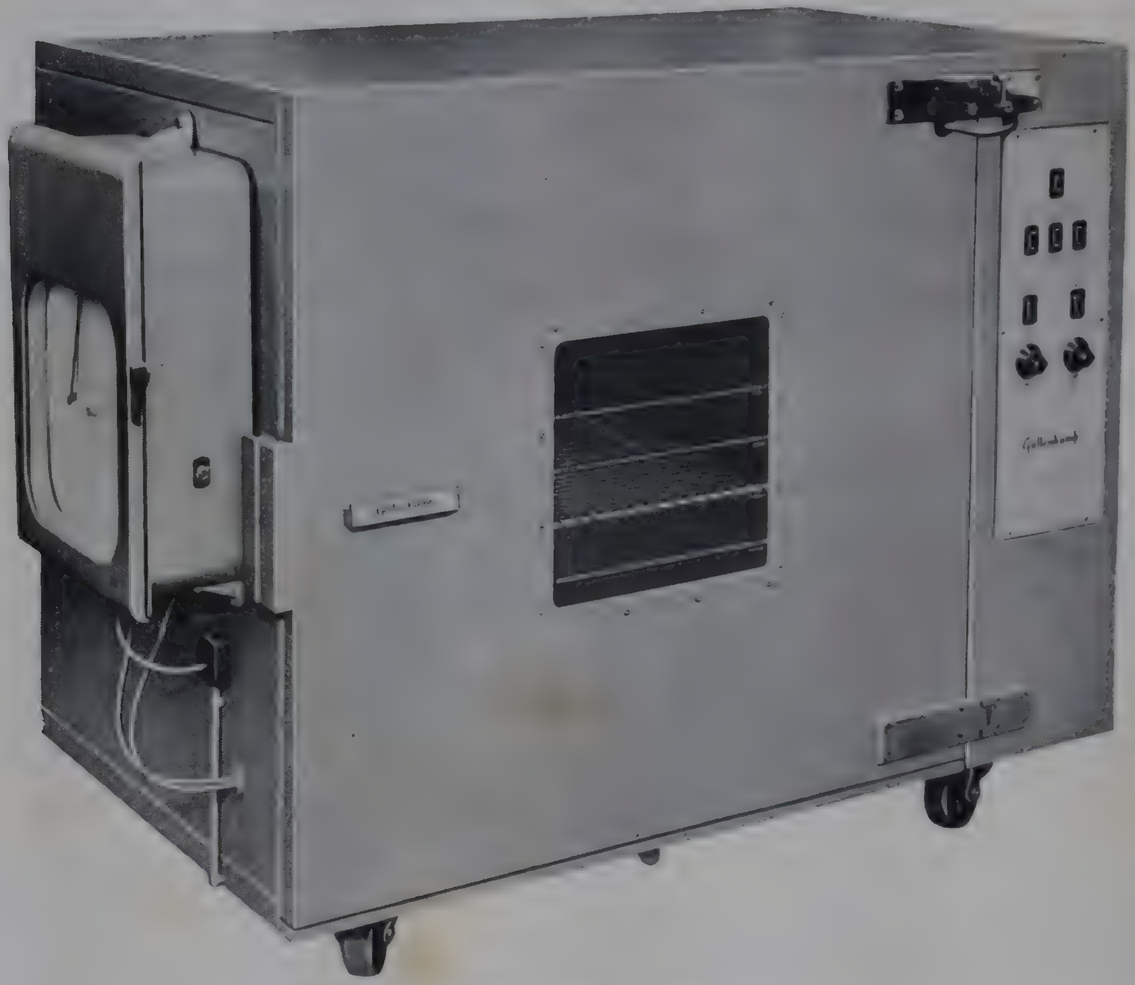
Items on this page normally available from stock except those coded *N*.

Gallenkamp HUMIDITY OVEN

WITH STEAM INJECTION HUMIDIFIER TO BS 3898 'LABORATORY HUMIDITY OVENS (INJECTION TYPE)'

For climatic and durability tests of electrical and electronic apparatus materials and components, for accelerated weathering tests of surface coatings and packing materials, for simulated tropical and extreme tropical conditions and for various botanical and zoological investigations.

- **Insulated stainless steel humidity chamber**
- **Air circulation by powerful centrifugal fan**
- **Temperature and humidity control by wet and dry bulb contact thermometers**
- **All controls housed in separate end compartment**
- **Welded steel outer case with castors for easy movement**
- **Adjustable safety thermostat**



OV-700 with OV-780

Suitable for the following standard test methods:

BS 2011	Basic climatic and durability tests for components for radio and allied electronic equipment.
DEF 12B	Equipment wires.
DEF 133	Climatic, shock and vibration testing of service equipment.
DEF 5011	Climatic and durability testing of service electronic components.
DEF 5214	Transformers and inductors primarily intended for use in electronic equipment.
DTD 919B	Electroplating of aluminium, steel and copper with silver and nickel.
DTD 1085C	Climatic testing of airborne instruments and equipment.
DTD 1086C	Climatic testing of ground instruments and equipment.
IEC 68, 2nd Edition	Basic climatic and mechanical robustness testing procedure for components for electronic equipment.
ISAT	Intensified standard alternating trials, series A & B.
K 114, Issue 2	Climatic and durability testing of service telecommunication equipment.
K 1007, Issue 3	Semiconductor devices.
MIL-E-5272C	Environmental testing of aeronautical and associated equipment.
MIL.STD.202B	Methods 103 and 106.
RCS 11, Issue 5	Climatic and durability testing of service electronic components.
RIC 11	Climatic and durability tests for components for radio and other electronic equipment.

Gallenkamp HUMIDITY OVEN

(continued)

PERFORMANCE AND CONSTRUCTION OF BASIC OVEN

The humidity chamber and the control compartment are housed within the welded, heavy gauge steel outer shell.

Humidity chamber

Constructed from stainless steel and insulated with 3·8 cm thickness fibre glass insulation, the humidity chamber is fitted with runners for two 2·4 cm grid wire shelves. Circulating air is ducted across the heater to top and bottom of the chamber. For rapid, accurate response, the bulbs of the controlling contact thermometers are placed close to the fan, within the air duct. Drainage is provided for accummulated condensate.

The door is fitted with a heated, double glazed window 30 × 30 cm for unimpeded viewing of samples under test. On closing, the door is sealed by a moulded rubber gasket which makes the whole chamber substantially airtight. The door is fitted with an adjustable catch which confers positive reliable closure.

Control equipment

In the basic oven the control equipment comprises the steam raising boiler, fan motor, contact thermometers, transformer for window heater, safety fuses and safety thermostat. A lift-out end panel permits easy access to this equipment and to all circuits including the connections to the front panel controls.

(1) Temperature control systems

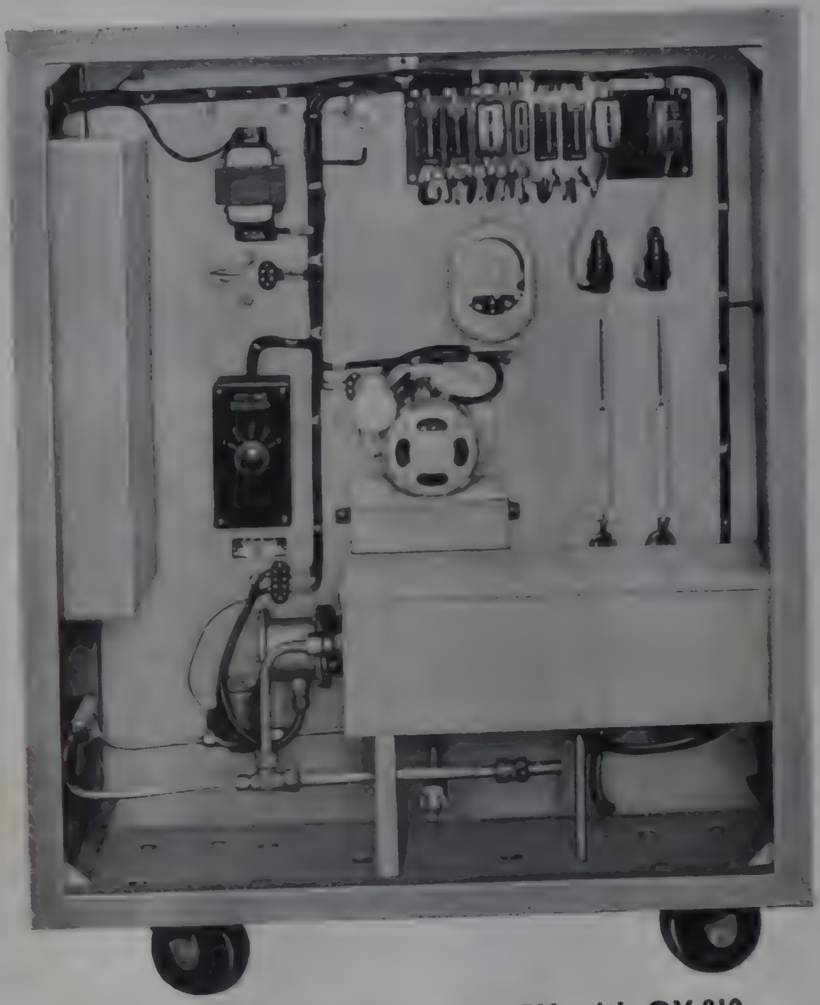
Temperature range	Fluctuation
Up to 100°C	±0·5°C

The oven temperature is controlled by means of the 0 to 110°C dry bulb contact thermometer. Protection from overheating is provided by an adjustable snap-action safety thermostat which takes over control of the power supply to the oven and boiler heaters at any preset temperature in the range 20 to 100°C. The energy regulator in the heater circuit may be adjusted to provide the optimum average heating rate for the operating temperature.

(2) Humidity control systems

The humidity is controlled by a second contact thermometer, its bulb sleeved with a cotton wick dipping into a constant level water trough. This is used as a wet bulb thermometer which is set at a temperature less than the nominal oven temperature by the depression equivalent to the required relative humidity. The wet and dry bulb thermometers are placed close together and their bulbs, which are in the air duct, are adequately ventilated. It is not possible to state actual figures for the regulation obtained, as the percentage variations depend on working temperatures, but the wet bulb depression can be maintained to 0·5°C or better, when the controls are correctly set. External conditions can affect the working conditions at the lower end of the temperature range. Provision is made to reduce the control sensitivity for when wider range temperature cycling is required for certain tests.

To increase the relative humidity, water vapour, produced in a small boiler is introduced near the fan and rapidly dispersed throughout the chamber. The boiler is fed with water from a constant level cistern and is heated by an immersion heater. An integral safety thermostat prevents damage in case of boiling dry. The system of direct steam injection is capable of giving practically 100% relative humidity at all temperatures. The minimum conditions obtainable depend on ambient humidity and temperature, but since the oven can be effectively sealed, low values of humidity can be obtained by using trays of salts or drying agents or either the refrigeration accessory OV-850 or the air injection fan OV-845.



Control compartment of OV-700 with OV-810

DIMENSIONS

	H	W	D	
Dimensions, internal	71 ×	81	68·5	cm
	28 ×	32	27	in
external	109 ×	122	79	cm
	42 ×	48 ×	30	in
Door opening	71 ×	71 cm		
	28 ×	28 in		
Weight, net	190 kg 420 lb			
Power rating, max.	3 kVA			

Gallenkamp HUMIDITY OVEN AND ACCESSORY EQUIPMENT

(continued)

ORDERING SPECIFICATION

OV-700

HUMIDITY OVEN, *Gallenkamp*, as specification, with stainless steel humidity chamber, wet and dry bulb contact thermometers, ducted centrifugal fan, steam injection system, sheathed heater and safety thermostat. For single phase supplies. **Without shelves.**

For 220/240V 50 Hz ... ... Each **£755**. **0**. **0**. *bN*
For 200/210V 50 Hz ... ... Each **£755**. **0**. **0**. *bN*
For 110/120V 60 Hz ... ... Each **£762**. **0**. **0**. *bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

OV-705	**Immersion element,** for boiler, safety type.	Each **£5.18. 0.**	*b*
OV-707	**Fuse,** 15A for 200/240V ovens.	Dozen **£0.17. 0.** Each **£0. 3. 0.**	*c*
OV-708	**Fuse,** 30A for 110/120V ovens.	Dozen **£0.19. 0.** Each **£0. 3. 2.**	*c*
EB-120	**Fuses,** 60 mA and 1A. For prices see entry in List No. sequence.		
OV-608	**Fan motor,** capacitor start induction type, with stainless steel shaft. For price see entry in List No. sequence.		
OV-712	**Air heater,** inconel sheathed ...	Each **£5. 8. 0.**	*b*
OV-718	**Contact thermometer,** scale span 0 to 110°C in 1°C.	Each **£12. 0. 0.**	*c*
OV-722	**Insulating sleeve, PVC,** placed over the bulb of the contact thermometer to increase the differential to between 2 and 3°C	Each **£0. 5. 3.**	*b*
OV-724	**Wicks,** for thermometer OV-718.	Pack of 12 **£0.10. 9.**	*c*

When ordering replacement parts please quote apparatus number and state voltage and nature of supply.

OV-780

TREATMENT OF WATER SUPPLY TO HUMIDITY OVEN

In hard water areas it is advisable to supply the boiler with deionised or distilled water to prevent the deposition of chalk.

MISCELLANEOUS FITTINGS

OV-735

SHELF, WIRE MESH, two can be used in oven OV-700.
Each **£14.15. 0.** *b*

OV-740

EXTENSION LEGS, 30 cm long to raise the oven above the floor in order that a large drainage tray can be used in the absence of a suitable floor drain.
Set of 4 **£21.10. 0.** *b*

DRIP TRAYS

We shall be pleased to quote for any size of tray in galvanised iron, tinned copper or stainless steel to collect the drainage from the outlet in the bottom of the oven.

OV-765

PANEL WITH BUSHINGS, for making electrical connections to equipment inside the oven. Comprises a detachable metal panel 13 × 13 cm, fitted with four bushings rated at 5000V 30A, and suitable for frequencies up to 200 MHz ... ... Each **£23.10. 0.** *bN*

No extra fitting charge is made if ordered with oven.

Other types of bushings available.

Cables can be taken through a ventilator aperture.

OV-770

REMOTE CONTROL KNOB, for operating the controls of equipment under test inside the oven. Comprises a $\frac{5}{16}$ in diameter rod in a plain bearing fitted at one end with a bakelite knob. The other end projects inside the oven and can be coupled through a suitable driving link to the equipment under test. Subject to considerations of the construction of the oven and the other accessories used, the control knob may be fitted to almost any part of the end wall opposite to the control compartment.
Each **£2.18. 0.** *bN*

No extra fitting charge is made if ordered with oven.

When ordering please state preferred location of knob.

HUMIDITY MEASURING AND RECORDING EQUIPMENT

OV-780

RECORDING HYGROMETER, *Bristol's*, wet and dry bulb with synchronous electric motor giving 24 hr rotation. The recorder charts are 12 in diameter with range 0–100°C. Complete with water trough, piping for connecting trough to oven water system, wet bulb wick, mains cable and instructions ... Each **£117.15. 0.** *m*

No extra fitting charge is made if ordered with oven.

Similar recorders with different ranges and rotational speeds are available. Full details on application.

When ordering please state voltage and nature of supply.

HV-120

HYGROMETER, Mason type, wet and dry bulb, scale span 0–100°C in 1°C. For full details and price see entry in List No. sequence.

HV-150

HYGROMETER, *Gallenkamp*, wet and dry bulb, scale span 0–100°C in 1°C. For full details and price see entry in List No. sequence.

TK-150

THERMOHYGROGRAPH, for daily recordings. For full details and price see entry in List No. sequence.

Items on this page normally available from stock except those coded *N*.

Gallenkamp HUMIDITY OVEN—ACCESSORY EQUIPMENT

(continued)

PROGRAMME CONTROL SYSTEMS

To enable cycling between sets of fixed conditions or for more elaborate programmes to be carried out, a number of additional control systems is available. No extra charge is made for fitting these systems if they are ordered to be supplied with the oven. When ordering control systems please state voltage and nature of supply.

■ SIMPLE TIME CYCLE CONTROLLER

OV-805

TIME SWITCH, with 24 hour dial and one pair of contact arms. Either or both air heater and boiler can be switched on and off at adjustable times. The oven can thus be cycled between controlled conditions and approximately ambient conditions once every 24 hours.
Each **£13. 10. 0.** *b*

■ GENERAL PURPOSE PROGRAMME CONTROLLER

The control system comprises a water spray cooler, a time switch and a 5-position switch which together provide the following programmes:

1. Continuous control by wet and dry bulb contact thermometers, time switch and spray cooling inoperative.
2. As 1 but with time switch producing automatic cycling between controlled conditions and approximately ambient once every 24 hours.
3. As 2 but with water spray operating during cooling period.
4. Heating by boiler only with time switch producing automatic cycling between any temperature and approximately ambient temperature with near 100% r.h. throughout. Spray cooling inoperative.
5. Heating by air heater only and time switch producing automatic cycling between any temperature and approximately ambient once every 24 hours.

These programmes are suitable for general damp heat and simulated tropical exposure tests including the following standard methods:

Dry heat tests to: BS 2011, DEF 133, DEF 5011, DEF 5214, DTD 1086C, RCS 11 and RIC 11.

Damp heat or accelerated damp heat tests to: BS 2011, DEF 12B, DEF 133, DEF 5011, DEF 5214, IEC 68, K 114, K 1007 method A, RCS 11 and RIC 11.

Humidity tests to: DTD 919B, MIL-STD-202B method 103A and MIL-E-5272C procedure 3.

Tropical exposure and life tests to: DEF 12B, DEF 133, DEF 5214, DTD 1085C, DTD 1086C, K 114 and RCS 11.

Other tests: K 1007 method B and MIL-E-5272C procedure 1.

OV-810

GENERAL PURPOSE PROGRAMME CONTROLLER, as specification including OV-840 water spray cooler, OV-805 time switch and 5-position switch.
Each **£49. 0. 0.** *b*

■ PROGRAMME CONTROLLER for K 1007 and MIL STD 202

By the addition of an extra contact thermometer, a time switch with two contact arms, a water spray cooler, a relay and a switchbox, the oven can be made to reproduce automatically the cycle specified in specification K 1007 method C and MIL STD 202B method 106A.

OV-817

PROGRAMME CONTROLLER K 1007 and MIL STD 202B, as specification including additional contact thermometer, time switch, OV-840 water spray cooler, relay and switchbox ... Each **£43. 0. 0.** *b*

OV-819

PROGRAMME CONTROLLER providing the combined facilities of the OV-810 General Purpose Programme Controller, and OV-817 Programme Controller for K 1007 and MIL STD 202B ... ... Each **£72. 0. 0.** *b*

■ PROGRAMME CONTROLLER for ISAT test schemes

By the addition of extra contact thermometers, a 3-pole changeover time switch and selector switches the oven can be made to reproduce the A and B test schedules of the Ministry of Supply Intensified Standard Alternating Trials (ISAT).

OV-820

PROGRAMME CONTROLLER for ISAT test schedules as specification including contact thermometers, time switch and selector switches.
Each **£106. 10. 0.** *b*

REPLACEMENT PARTS

OV-830	**Thermometer, fixed contact, 115°F.**	Each	**£6. 5. 0.**	*c*
OV-832	**Thermometer, fixed contact, 167°F.**	Each	**£6. 5. 0.**	*c*

ACCESSORY

OV-834	**Recording hygrometer** as OV-780, but with 7 day chart	Each	**£117. 15. 0.**	*m*

SPECIAL PROGRAMME CONTROL SYSTEMS

As will be seen from the foregoing specifications a very wide range of automatically controlled programmes can be provided. Ovens have been supplied with many similar systems and also with systems giving full control over both temperature and humidity throughout the whole of the cycle. We are always pleased to investigate the possibility of providing control circuits for special programmes on receipt of full details of requirements.

All items on this page normally available from stock.

Gallenkamp HUMIDITY OVEN—ACCESSORY EQUIPMENT

(continued)

ACCELERATED COOLING AND DRYING EQUIPMENT

OV-840

WATER SPRAY COOLER, for increasing the cooling rate of the oven and for maintaining saturated conditions during cooling periods. This accessory consists of an atomising spray connected to the water system through a solenoid valve and a filter. The valve is controlled by the wet bulb contact thermometer and the spray operates when the boiler is switched off. An isolating switch is fitted so that the oven can be used without spray cooling. Each **£23. 0. 0.** *b*

OV-845

AIR INJECTION FAN, for reducing the relative humidity in the oven rapidly and for maintaining relative humidities close to the theoretical minimum for the ambient conditions. A centrifugal fan driven by a shaded pole motor is mounted in the control compartment and blows room air into the duct beside the fan. An isolating switch is fitted ... ... Each **£23. 0. 0.** *b*

When ordering accessory equipment please state voltage and nature of supply.

OV-700 with OV-850

REFRIGERATION EQUIPMENT

For operating the oven at temperatures below ambient or for dehumidifying, refrigeration equipment can be supplied and fitted. The cabinet is not suitable for operation below 0°C.

Ambient temperature °C	20	25	30	35	40	43
Minimum working temperature °C	0	3	6	9	11	13

The ¼ hp fan cooled condensing unit is mounted on the top of the oven and the large area evaporator coil is situated in the bottom air duct. In use the refrigerator is run continuously and temperature control is provided by the dry bulb contact thermometer in conjunction with the oven heater. This method of use gives the longest compressor motor life. Excess pressure and overload protection devices are built in.

OV-850

REFRIGERATION EQUIPMENT, as specification, for operation in locations where the ambient temperature does not exceed 35°C ... ... Each **£225. 0. 0.** *b*

No extra fitting charge is made if ordered with oven.

OV-852

REFRIGERATION EQUIPMENT, as specification, for operation in locations where the ambient temperature can rise to but not exceed 50°C ... Each **£246. 0. 0.** *b*

No extra fitting charge is made if ordered with oven.

ULTRAVIOLET IRRADATION EQUIPMENT

For simulating the weathering effect of sunlight under various conditions of temperature and humidity.

This powerful source of ultraviolet radiation below 3200Å can be built into the back wall of the oven. It consists of a high pressure mercury arc tube in a well ventilated housing, with an anodised aluminium reflector.

The radiation passes through a polished silica window 15 cm square, which is sealed into the oven wall by means of a moisture proof gasket. The arc tube is a straight quartz tube 17 mm bore, with solid activated electrodes giving an effective arc 13 cm long. Provision is made for increasing the voltage supplied to the tube in order to maintain constant intensity as the tube ages.

SPECTRUM

The arc tube generates the characteristic high pressure mercury arc, covering the spectrum range from 1849·5Å in the far ultraviolet up to 17,193Å in the infrared. The ultraviolet radiation from the tube is 60W out of a total radiant emission of 250W. The intensity of radiation below 3200Å is 330 mW/cm² at a distance of 1 metre, measured without a reflector. The control unit is mounted beside the control compartment at the rear of the oven.

OV-860

ULTRAVIOLET IRRADIATION EQUIPMENT, as specification, with control unit comprising an auto-transformer, starting and intensity stabilising circuits. The total consumption average 550W. For 110/120 or 200/250V a.c. single phase ... ... Each **£150. 0. 0.** *g*

No extra fitting charge is made if ordered with oven.

REPLACEMENT PART

OV-866 Quartz tube ... ... Each £15. 10. 0. *fS*

Items on this page coded *S* **normally available from stock.**

Gallenkamp DRYING CABINET

For rapid and controlled drying of glassware or chromatography paper up to sheet size 58×68 cm.

- **Maximum temperature 120°C**
- **Large capacity**
- **Toughened glass doors**
- **Control by direct reading thermostat**

PERFORMANCE AND DIMENSIONS

Temperature fluctuation	±3°C
Temperature variation	8°C
Time to heat to 100°C	30 min
Power rating, max.	1·8 kW
Shelves	
Dimensions	67×33 cm (26½×13 in)
Number supplied	2
Number of positions	4
Interval between positions	15 cm (6 in)

Dimensions	H		W		D	
Internal	72	×	64	×	37	cm
	28½	×	25	×	14½	in
External	107	×	76	×	38	cm
	42	×	30	×	15	in
Weight (net)	52 kg				114	lb

OV-880 with OV-892

DESIGN

The heating elements, which are protected from spillage by baffles, are housed in the bottom compartment of the cabinet. Hot air convects rapidly through the cabinet interior and emerges through the adjustable ventilator at the top, carrying away with it moisture and other vapours.

The interior of the cabinet is lined with asbestos board insulation. Temperature is controlled by means of an hydraulic thermostat calibrated from 30 to 120°C in 5°C subdivisions. The indicator lamp shows when the heater is on.

OV-880

DRYING CABINET, *Gallenkamp*, as specification, with hydraulic thermostat and load indicator lamp, toughened glass doors, adjustable ventilator, one each 12·5 and 25 mm wire mesh shelves. For a.c. single phase supplies.

For 220/240V	Each	£78. 0. 0.	*b*
For 200/210V	Each	£80. 0. 0.	*bN*
For 110/120V	Each	£80. 0. 0.	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PART

OV-884	**Heating element ... ...**	Each	£2. 4. 0.	*b*

When ordering replacement parts please state serial number of oven and supply voltage.

ACCESSORIES

OV-886	**Extra shelf,** 12·5 mm mesh ...	Each	£1. 14. 0.	*b*
OV-887	**Extra shelf,** 25 mm mesh	Each	£1. 14. 0.	*b*
OV-889	**Rack,** with clips for suspending six sheets of chromatography paper, to fit within the top of the cabinet.	Each	£5. 14. 0.	*b*
OV-890	**Extra clips,** for OV-889 ...	Pack of 12	£1. 17. 0.	*b*
OV-892	**Exhaust fan,** for fitting in place of the top ventilator to increase the rate of removal of moisture or fumes. Its outlet, which is suitable for connecting to ducting of extraction systems, takes 76 mm bore tube. For single phase supplies only.			
	For 200/250V 50 Hz	Each	£19. 10. 0.	*b*
	For 110/120V 60 Hz	Each	£19. 10. 0.	*bN*

When ordering please state voltage and nature of supply.

Items on this page normally available from stock except those coded *N*.

Gallenkamp VACUUM OVENS, 150°C

For accelerated batch drying or for preventing decomposition of heat sensitive materials without loss of drying speed. With uses in chemical, biological, pharmaceutical and other fields.

- **Temperature control within 0·5°C**
- **Two sizes available**
- **All controls built-in**
- **Glass fibre reinforced plastics case**
- **Safe, reliable operation**

PERFORMANCE AND DIMENSIONS

Size No.	1	2
Temperature range	ambient +5°C to 150°C	
Time to heat to 150°C	45 min	60 min
Temperature control	within 0·5°C	
Vacuum and gauge range	0–760 mm (0–30 in) Hg	
Number of shelves	2	2
Shelf area	1580 cm^2 (245 in^2)	2970 cm^2 (460 in^2)
Distance between shelves	10·2 cm (4 in)	12·7 cm (5 in)
Internal dimensions		
Diameter	30·5 cm (12 in)	38 cm (15 in)
Maximum depth	35·5 cm (14 in)	53 cm (21 in)
External dimensions	H W D	H W D
	53 × 46 × 56 cm	62 × 56 × 60 cm
	21 × 18 × 22 in	24½ × 22 × 23½ in
Power rating, max.	800W	1150W

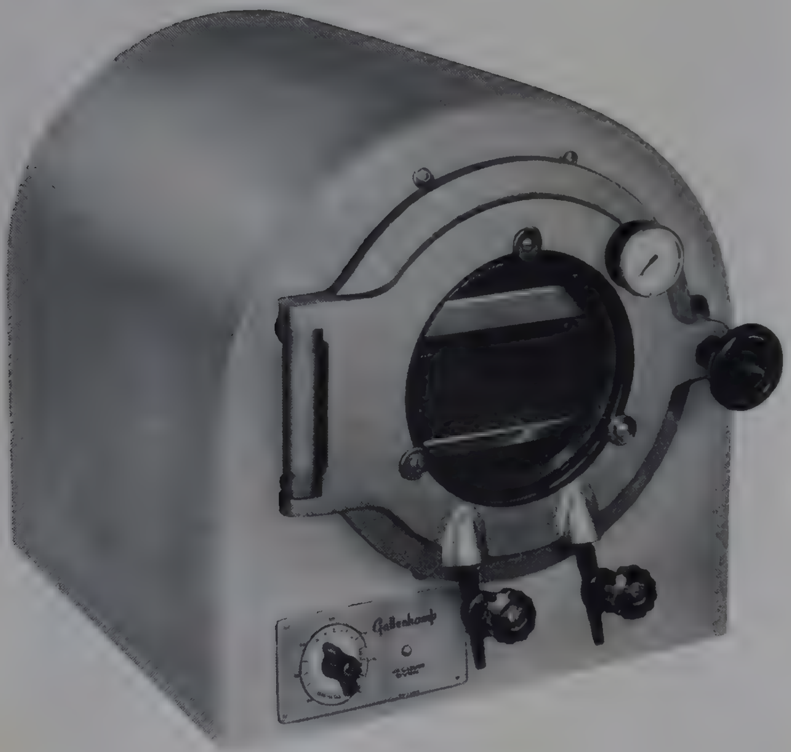
DESIGN

The oven comprises an anodised aluminium alloy vacuum chamber with a self-aligning door fitted with an observation window. Surrounding the chamber is a glass reinforced plastics outer case which remains cool at all operating temperatures and is easily kept clean.

A thermometer well is fitted to enable the vacuum chamber temperature to be measured.

Heating is by built-in heaters controlled by a direct reading thermostat with an OFF position. A load lamp indicates when the heaters are energised.

To leave the vacuum chamber free from obstruction, the vacuum fittings are all mounted on the door. They comprise a vacuum dial gauge and two **diaphragm** valves with insulated handles which remain cool at all operating temperatures. The valves are for vacuum line connection and air bleed respectively and the nozzles of both point downwards to avoid possible kinking of flexible connecting tubes. The nozzles are serrated and accept 6·5–8 mm bore vacuum tubing.



OV-930

OV-930

OVEN, VACUUM, *Gallenkamp*, electrically heated, as specification, with glass reinforced plastics outer case, direct reading thermostat and heater load indicator lamp, door with observation window, vacuum dial gauge and two diaphragm vacuum valves. Supplied with two shelves.

Size No.		1	2	
For 220/240V a.c.	Each	**£89. 10. 0.**	**£195. 0. 0.**	g
For 200/210V a.c.	Each	**£92. 0. 0.**	**£198. 0. 0.**	g
For 110/120V a.c.	Each	**£92. 0. 0.**	**£198. 0. 0.**	g

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

OV-934	**Door gasket,** for size 1 oven ...	Each	**£2. 0. 0.**	g
OV-936	**Door gasket,** for size 2 oven ...	Each	**£3. 0. 0.**	g
OV-938	**Diaphragms,** for valves ...	Pack of 4	**£0. 17. 6.**	g

ACCESSORIES

TJ-340	**Thermometer,** range 0–150°C ...	For details and prices see entries in List No. sequence.
TX-755	**Tubing,** neoprene, heavy wall. Designations H6·5 and H8	

Suitable pumps for use with vacuum ovens see VACUUM section.

All items on this page normally available from stock.

PAINT TESTING

This section lists a selection of the more important specialised apparatus required in the paint testing laboratory. Most apparatus complies with AID, DEF, BS or other specifications. Apparatus accommodating test panels takes standard 6×4 in panels unless otherwise stated. In most instances brief outline specifications only are given, but fully detailed pamphlets are available on application. We shall be pleased to quote for any apparatus not included in this list. General apparatus not exclusively used for paint testing purposes will be found under appropriate headings throughout the catalogue.

Gallenkamp PAINT CORROSION OVEN

For investigating the resistance of paints to conditions of high temperature and humidity. It conforms to requirements of M.O.S. specification DEF 1053, Method 25, and BS 3900 Part F2 'Resistance to Humidity under condensation conditions'.

ELECTRICAL CONTROLS

The electrical controls, mounted on the side of the oven, comprise a motor switch, mains and thermostat indicator lamps and the thermostat heads.

HUMIDITY

A partition in the liner base forms a shallow water trough which is heated by a 450W immersion heater enabling 100% R.H. conditions to be maintained. Two drain cocks are fitted, one for removal of water from the trough and the other for removal of condensation collecting on the inner surface of the door.

TEMPERATURE

Two bimetallic thermostats are mounted above the water trough and adjacent to a constant speed fan which circulates the air efficiently. The thermostats may be set to allow the temperature to cycle between 42 and 48°C or as required, and by adjustment of a resistor in series with the heater a time cycle within 60 ±5 min, can be obtained.

NOTE: It is only possible to obtain the required temperature cycle in ambient temperatures up to about 30°C. In higher ambient temperatures, cooling is required. Details on application.

DESIGN

The electrically heated oven is strongly constructed in asbestolite and stands on four aluminium feet which allow adequate space for inserting a drip tray. The interior and door box are stainless steel with an air space all round. The door is fitted with robust hinges and is closed, against a moulded rubber gasket, by a roller bolt catch. The oven will take six racks PB-212 each accommodating eight test panels.

PB-210 with PB-212 and PB-215

DIMENSIONS

	H		W		D
Overall	105	×	69	×	53 cm
Internal	74	×	40	×	38 cm
Racks	9	×	39	×	11 cm

PB-210
OVEN, PAINT CORROSION, *Gallenkamp*, as specification. For single phase supplies.

For 220/240V 50 Hz	Each **£270. 0. 0.**	*b*
For 200/210V 50 Hz	Each **£270. 0. 0.**	*bN*
For 110/120V 60 Hz	Each **£270. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

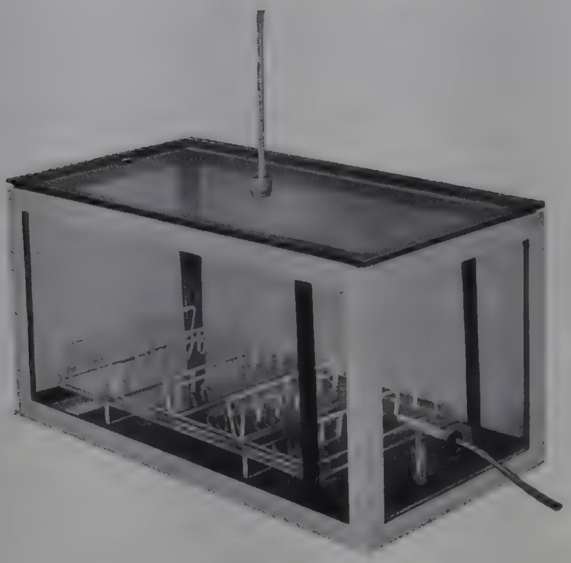
ACCESSORIES

PB-212	**Rack,** tinned copper, for 6×4 in test panels, with corrugated sides of ½ in pitch to take 8 test panels at 1½ in intervals	Each **£8. 10. 0.**	*b*
PB-213	**Immersion element,** 450W, replacement.	Each **£2. 5. 0.**	*b*
PB-215	**Thermometer, recording,** circular chart with 0 to 75°C range	Each **£45. 10. 0.**	*f*
IH-110	**Thermometer,** scale span 10 to 60°C. For details and price see entry in List No. sequence.		

Gallenkamp **particle size apparatus** including sedimentation balance and Andreasen pipette see **PARTICLE SIZE APPARATUS.**

Items on this page normally available from stock except those coded *N*.

Gallenkamp SALT SPRAY APPARATUS

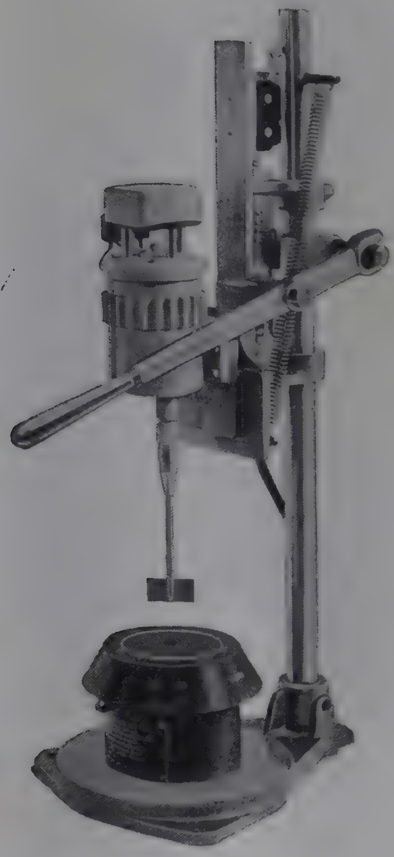

PB-230

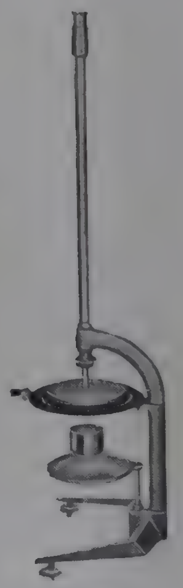
PB-230
SALT SPRAY APPARATUS, *Gallenkamp,* for testing the resistance of paints and allied materials to continuous salt spray as specified in BS 3900 Part F4 and DEF 1053 Method 25. Comprises glass panels set in a nylon coated iron frame to form a tank having internal dimensions 60 × 30 × 29 cm deep. With plate glass cover, having central 2 cm diameter thermometer hole and 2·5 cm diameter vent hole, glass atomiser fitted through the end wall and glass baffle plate to prevent spray from playing directly on test panels. The tank will accept one drainage tray PB-234 and up to four sample racks PB-236. **Without racks, tray or thermometer** ... Each **£11. 0. 0.** *b*

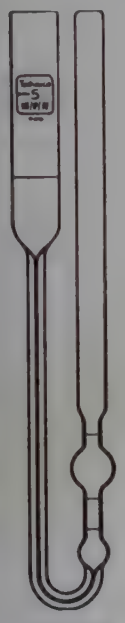
REPLACEMENT PART
PB-232 Atomiser, glass ... ... Each **£0. 7. 6.** *a*

ACCESSORIES
PB-234 Tray, drainage, perspex to hold four racks PB-236. Each £1. 17. 0. *b*
PB-236 Rack, perspex, to hold six test panels Each £1. 3. 0. *b*
TJ-050 Thermometer, range 0 to 60°C. For details and price see entry in List No. sequence.

Suitable **air compressor** see AF-430 et seq. in List No. sequence. Other **salt spray cabinet** for corrosion testing see MH-860 in List No. sequence.


PB-255


VS-010


VS-250

VS-132
VS-134
VS-136

VS-145

VISCOMETERS

SUITABLE FOR PAINT TESTING

PB-255
VISCOMETER, ICI ROTOTHINNER, Mk. IIA comprising constant speed motor, stirrer and turntable with a torque measuring attachment. Graduated 0 to 15 poises ... ... Each **£95. 15. 0.** *fN*

Full details on application.

VS-010
TORSION VISCOMETER, *Gallenkamp.*

VS-105
ROTATING CYLINDER VISCOMETER.

VS-132
FLOW CUP, *Gallenkamp,* **BS 1733 type B2.**

VS-134
FLOW CUP, *Gallenkamp,* as VS-132 but **type B4.**

VS-136
FLOW CUP, *Gallenkamp,* as VS-132 but **type B6.**

VS-140
FLOW CUP, *Gallenkamp,* **Ford No. 4.**

ACCESSORY
VS-145 Stand for VS-132 to VS-140 with enamelled base, levelling feet and chromium plated rod with adjustable support bracket.

VS-160
ZAHN CUP VISCOMETER.

VS-250
U-TUBE REVERSE FLOW VISCOMETER, *Technico.*

For full details and prices see entries in List No. sequence.

Items on this page normally available from stock except those coded *N.*

PB-285

HARD DRYING TIME APPARATUS, to DEF 1053 Method 8, comprising a loaded mechanical thumb which is forced round on the surface of the test panel. Each **£50. 0. 0.** *f*

PB-300

FILM APPLICATOR, standard, for 4 in. wide panels. Gap sizes 0·001, 0·002, 0·003, 0·004 or 0·006 in. Each **£7.13. 0.** *f*

When ordering please state gap size required.

PB-320

SPINNER, ICI pattern, for applying film of exactly reproducible thickness to test panels. With time switch. For 200/250V 50 Hz supplies ... Each **£49.10. 0.** *f*

PB-335

BEND TEST HINGES, to DEF 1053 Method 13, for determining the flexibility adhesive properties of a material under specificed conditions. With mandrel size $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, or 1 in ... ... Each **£6. 2. 6.** *f*

When ordering please state mandrel size required.

PB-340

FALLING BLOCK IMPACT TESTER, to DEF 1053 Method 17a, comprising a single blow indenter 236 in/lb fall, which produces a predetermined amount of deformation. With stainless steel spacing washers. Each **£61. 5. 0.** *f*

PB-382

HARDNESS ROCKER, bubble type, for advanced investigations on hardening time ... Each **£22.17. 6.** *f*

ACCESSORY

PB-384 Levelling table and test plate ... Each £12. 5. 0. *f*

PB-390

SCRATCH TESTER, hand operated, to DEF 1053 Method 14. With one 1 mm ball ended needle, weights totalling 2000 g and lamp to indicate complete penetration ... ... Each **£34.15. 0.** *fS*

REPLACEMENT PART

PB-391 Needle, ball ended, 1 mm ... Dozen £1.17. 6. *fS*

PB-400

CRYPTOMETER, for measuring absolute hiding power of paint films. With black and white base plate for light and dark paints, respectively ... Each **£33. 7. 6.** *f*

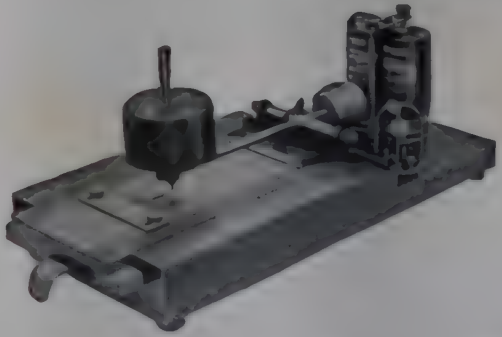
PB-420

FINENESS OF GRIND GAUGE, double channel, with scraper blade. Maximum depth 0·002 or 0·004 in. Each **£23. 5. 0.** *fS*

When ordering please specify maximum depth required.

PB-320

PB-382 with PB-384



PB-390

PB-430

PB-430

WET FILM THICKNESS GAUGE. Maximum thickness 0·004, 0·020 or 0·030 in. Each **£19. 7. 6.** *f*

When ordering please specify maximum thickness required.

For other suitable thickness gauges see MH-830 and MH-840 in List No. sequence.

PB-435

WEIGHT PER GALLON CUP, 100 ml, for Imperial gallon. With cover ... ... Each **£5. 5. 0.** *fS*

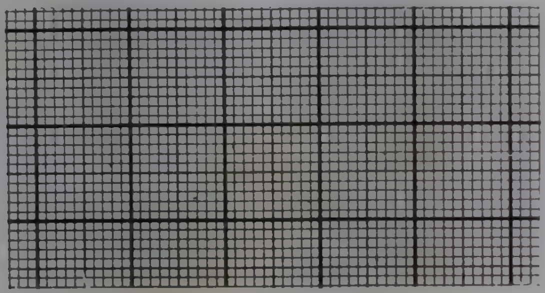
Items on this page coded *S* normally available from stock.

GRAPH PAPERS

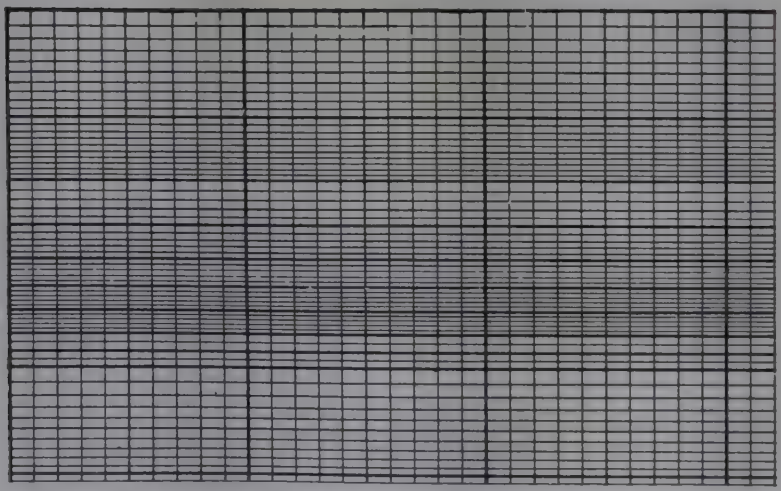
The graph papers and pads listed below are those in regular demand. We shall be pleased to quote (in minimum quantities of 500 sheets or 1 dozen pads) for other sizes and rulings on receipt of detailed requirements. Many hundreds of alternatives are available as follows.

Paper	Cartridge, cream wove, detail, tracing.
Colour	Blue, green, sepia, grey, red.
Sizes	For linear rulings 8×6½, 10¼×8, 13½×9, 16×13, 23×18, 30×22 in. and International sizes A1, A2, A3, A4 and A5. For logarithmic rulings 11×8½, 11×17, 13×13 in.
Rulings	Linear cm in mm, 2 cm in 2 mm. inches in 1/4, 1/5, 1/8, 1/10, 1/12, 1/16, 1/20 ths. Logarithmic 1 to 10 cycles × metric or inch linear. 1 to 10 cycles × 1 to 10 cycles. Isometric, polar and triangular co-ordinates.

All the graph papers listed are ruled in blue on cream wove paper with plain margins.



Cm in mm.



Logarithmic I way.

PAPER, asbestos see ASBESTOS GOODS
, chromatographic see CHROMATOGRAPHY
, filter see FILTER PAPER
, litmus etc. see TEST PAPERS
, sieve analysis see SIEVES

PB-850
PAPER, GRAPH, 13½×9 in, ruled both sides in cm and mm. In pack of 100 sheets.
5 packs **£2. 7. 6.** Pack **£0. 10. 0.** *m*

PB-852
PAPER, GRAPH, 13½×9 in, ruled both sides in inches and tenths. In pack of 100 sheets.
5 packs **£2. 7. 6.** Pack **£0. 10. 0.** *m*

PB-860
PAPER, GRAPH, 10¼×8 in, ruled both sides in cm and mm. In pack of 100 sheets.
5 packs **£1. 15. 0.** Pack **£0. 7. 6.** *m*

PB-862
PAPER, GRAPH, 10¼×8 in, ruled both sides in inches and tenths. In pack of 100 sheets.
5 packs **£1. 15. 0.** Pack **£0. 7. 6.** *m*

PB-870
PAPER, GRAPH, in pads of 50 sheets 10¼×8 in, ruled one side in cm and mm.
Dozen **£2. 6. 0.** Each **£0. 5. 2.** *m*

PB-872
PAPER, GRAPH, in pads of 50 sheets 10¼×8 in, ruled one side in inches and tenths.
Dozen **£2. 6. 0.** Each **£0. 5. 2.** *m*

PB-900
PAPER, GRAPH, in books of 80 pages 10¼×8 in (Physics notebooks), with graph ruling cm in mm on left pages, ruled feint with margin on right, stitched cloth back, semi-stiff cover.
Dozen **£1. 19. 9.** Each **£0. 4. 8.** *m*

PB-940
PAPER, LOGARITHMIC I way, 13×13 in, single cycle × cm in mm. In pads of 25 sheets printed one side.
4 pads **£1. 8. 6.** Each **£0. 8. 0.** *m*

PB-942
PAPER, LOGARITHMIC I way, 13×13 in, 3 cycle × cm in mm. In pads of 25 sheets printed on one side.
4 pads **£1. 8. 6.** Each **£0. 8. 0.** *m*

PB-950
PAPER, LOGARITHMIC 2 way, 13×13 in, single cycle × single cycle in pads of 25 sheets printed one side.
4 pads **£1. 8. 6.** Each **£0. 8. 0.** *m*

PB-952
PAPER, LOGARITHMIC 2 way, 13×13 in, 3 cycle × 3 cycle in pads of 25 sheets printed one side.
4 pads **£1. 8. 6.** Each **£0. 8. 0.** *m*

GLAZED SAMPLING PAPER

PB-980
PAPER, GLAZED SAMPLING, black, carton of 25 sheets, 20×15 in.
Dozen cartons **£7. 5. 0.** Each **£0. 13. 3.** *c*

PB-982
PAPER, GLAZED SAMPLING, white, carton of 25 sheets, 20×15 in.
Dozen cartons **£6. 5. 0.** Each **£0. 11. 3.** *c*

PLASTICS BACKED PAPER

PB-990
PAPER, ABSORBENT, *Benchkote*, backed with polythene film to prevent liquids penetrating right through and to give the material wet strength and durability. Recommended as a disposable covering for benches, animal cages, humidity cabinets, etc. either to localise spillage or for the collection of falling particles. Particularly useful in radiochemical and bacteriological laboratories. Packet of 50 sheets 46×57 cm... ... ... Packet **£2. 0. 0.** *d*

PB-991
PAPER, *Benchkote*, as above but supplied in 50 metre rolls.

Width	46	92 cm	
Roll	**£3. 5. 0.**	**£5. 10. 0.**	*d*

All items on this page normally available from stock.

Technico ANDREASEN PARTICLE SIZE APPARATUS

REGD. TRADE MARK

For the determination of particle sizes in materials such as clays, minerals, ceramics, pulverised fuel, cement, etc., by the pipette sampling method as specified in BS 3406 Part 2.

By agreement with Professor A. H. M. Andreasen of Copenhagen, we hold the sole rights of manufacturing and selling this apparatus in Great Britain, Northern Ireland, Eire, the Commonwealth, and North and South America.

Operation

A weighed quantity of powder is shaken with a definite volume of water or other liquid in which it can be dispersed, so that a homogeneous suspension is produced. By means of the pipette, using the 2-way stopcock, 10 cm³ portions of the suspension are extracted from the bottom of the bottle after measured intervals of time, and are transferred to weighed dishes. The contents of the dishes are evaporated to dryness and weighed. Since the times taken by particles to fall through the test distance of 20 cm in the suspension depends on their sizes, the particle size distribution in the powder can be determined from the weights of residue and the elapsed times.

References

Measurements of the fineness of powdered materials, H. Heywood, Trans. Inst of Mech. Engineers, Dec. 1938.
Grain size of whiteware clays as determined by the Andreasen pipette, George A. Lomis, Jour., Amer. Ceramic Soc., **21**, 1938, No. 11.

PC-550

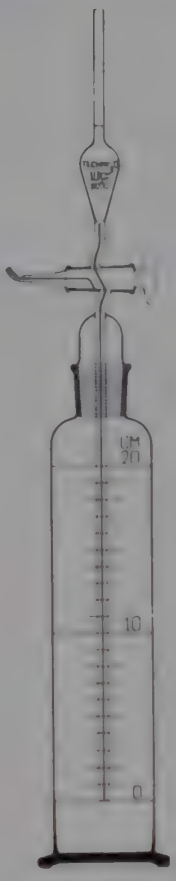
PARTICLE SIZE APPARATUS, Andreasen, *Technico*, as specification, with bottle graduated 0 to 20 cm and standard 10 cm³ pipette ... ... Each **£6. 10. 0.** *a*

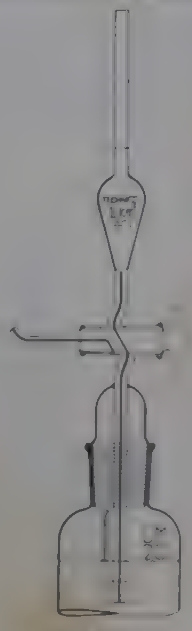
REPLACEMENT PARTS

PC-552 **Bottle,** 0–20 cm, 29/32 socket ... Each **£3. 0. 0.** *a*
PC-553 **Pipette,** *Technico*, 10 cm³, 29/32 cone. Each **£3. 10. 0.** *a*

ACCESSORY

PC-555 **Pipette,** *Technico*, 10 cm³ modified. For use with exceptionally fine materials using sampling depth of 20 mm, 29/32 cone ... ... Each **£4. 2. 0.** *a*


PC-550


PC-555

PARTICLE SIZE APPARATUS WITH VARIABLE SAMPLING DEPTH

To British Standards 812 and 1377

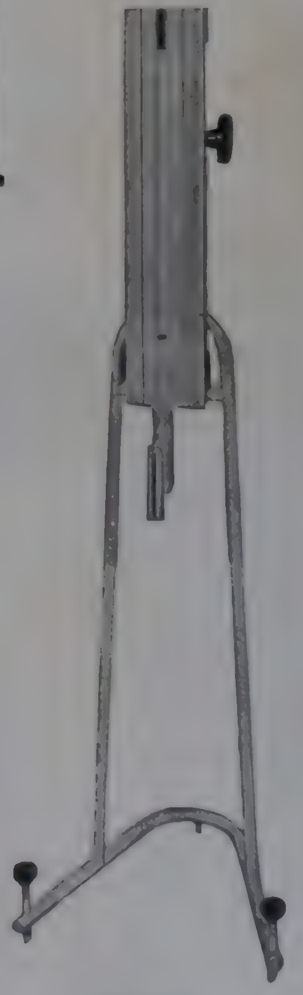
Based on the same principle as the Andreasen apparatus but designed so that samples may be withdrawn from any desired depth.
Consists of a tubular steel stand, with levelling feet and vertical slide having rack and pinion for height adjustment. A scale is fitted to the stand to indicate the movement of the slide. The slide is designed to hold the sampling pipettes listed below with sufficient room underneath for either a 500 cm³ or a 1000 cm³ cylinder containing the sample and, if required, a thermostatic water bath. The rack and pinion allow the pipette to be lowered into the sample and removed again very smoothly and without disturbing the sedimentation.

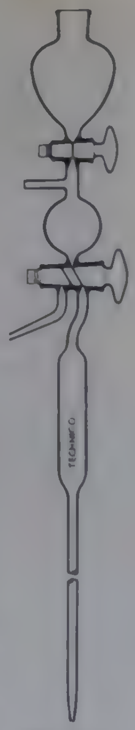
PC-600

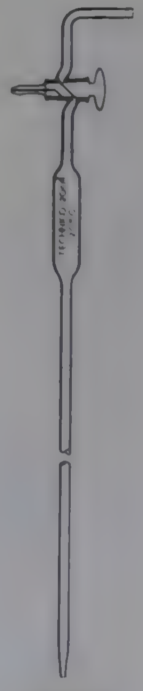
PARTICLE SIZE APPARATUS STAND, as specification. Without sampling pipette or container. Each **£13. 10. 0.** *b*

ACCESSORIES

PC-610 **Sampling pipette,** *Technico*, 25 cm³ to BS 812. Incorporating two stopcocks, suction bulb and distilled water reservoir ... ... Each **£4. 18. 0.** *a*
PC-612 **Sampling pipette,** *Technico*, 10 cm³ to BS 1377. Incorporating two stopcocks, suction bulb and distilled water reservoir ... ... Each **£4. 17. 0.** *a*
PC-615 **Sampling pipette,** *Technico*, 20 cm³, simple design incorporating single stopcock only. Each **£2. 6. 0.** *a*
CY-224 **Cylinders,** *Technico*, graduated, 500 cm³ and 1000 cm³, to hold samples ... ...
SU-760 **Stoppers** for above cylinders, sizes 41 and 53 ... ...
} For details and prices see entries in List No. sequence.


PC-600


PC-610
PC-612


PC-615

Sieves for particle sizing see SE-045 et seq. in List No. sequence.

All items on this page normally available from stock.

Gallenkamp SEDIMENTATION BALANCE

FOR PARTICLE SIZE DETERMINATION IN THE RANGE 5 to 75 μ

British patent No. 712,434. U.S. patent No. 2,699,673.
IN ACCORDANCE WITH BS 3406 Part 2

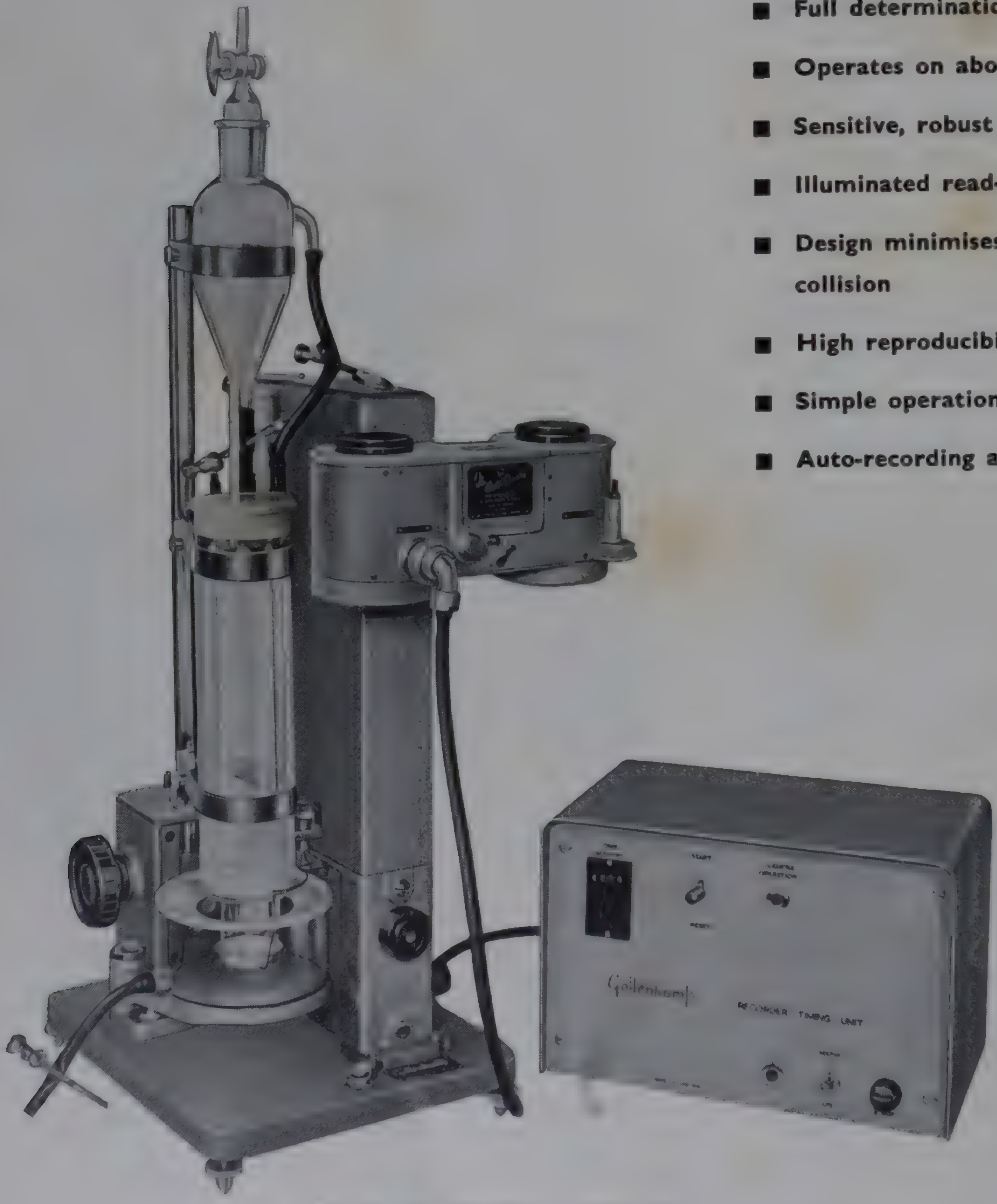
Devised by Mr. W. Bostock of the Research Department, Simon Carves Ltd.

Bibliography

Bostock, W. J.Sci. Inst. **29**, 1952, 209.
Cohen, L. Instrument Practice, **13**, 1959, 1036.
Kaye, B. H. Paint Oil and Colour Journal, July 1966, 212.

Normally used for determination of particle size distribution within the range 5 to 75μ. Where, however, the largest size is not greater than about 20μ, the lower limit may be extended to about 2μ provided the temperature is controlled to within fairly narrow limits and neither agglomeration nor flocculation takes place.

- **Full determination from 5μ to 75μ in 6 hours**
- **Operates on about 0·5 g of sample**
- **Sensitive, robust torsion balance system**
- **Illuminated read-out from torsion balance**
- **Design minimises errors due to buoyancy and particle collision**
- **High reproducibility**
- **Simple operation and maintenance**
- **Auto-recording accessory available**



PC-650 with PC-680 and PC-685

Used successfully to analyse a wide variety of powdered materials including:

Alumina
Boiler and blast furnace dusts
Carborundum
Cement
China-clay
Flints
Flour
Limestone
Metal sintering powders
Paint and other pigments
Plastics powders
Pyrites

Gallenkamp SEDIMENTATION BALANCE

(continued)

PRINCIPLE

The powder is uniformly dispersed in a suitable liquid and the sedimentation column receiving tank are filled with the same liquid. When released, the particles slowly settle on the torsion balance pan and balance readings are taken at intervals.

The apparatus design minimises errors due to bouyancy and particle collision.

A particle size distribution curve is calculated by a simple formula explained in the instructions manual.

SEDIMENTATION TUBE ASSEMBLY

Comprises sample premixing vessel and sedimentation column. The sample container is internally siliconised, and has a conical base to allow the sample to flow freely into the sedimentation column, to which it is connected by a short length of rubber tubing fitted with a pinch clip A. The two vessels are connected by a second tube, also fitted with a pinch clip B, which allows air displaced by the sample to flow back into the premixing vessel.

The sedimentation column contains 250 ml of sample at a depth of 250 mm. An engraved scale enables the exact height of the suspension to be measured. The column is enclosed in a glass thermal stabilising jacket sealed by gaskets which are resistant to common dispersing media.

RECEIVING TANK

The cylindrical borosilicate glass tank rests below the sedimentation tube on a platform which can be swung sideways to allow the tank to be removed. It is fitted with a circular metal dust cover.

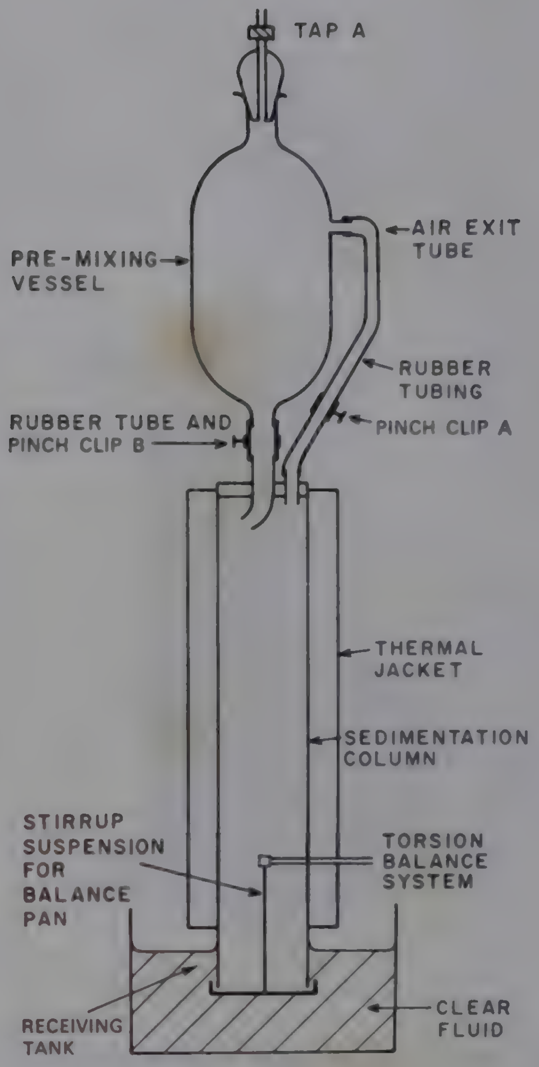
TORSION BALANCE

A horizontal torsion wire suspends a pan system on one side and an adjustable counterbalance on the other. The pan system comprises a light stirrup from which a small pan hangs freely immersed in the tank close to the sedimentation column, so that particles settling to the bottom of the column are caught and weighed in the pan. The mechanism can be clamped, and in the clamped position the pan is held against the sedimentation column. The torsion wire carries a vertical pointer fitted with a graticule, an image of which is projected on to a ground glass scale by an integral optical system. The graticule has an arbitrary scale of 0–100 divisions, and the zero is set by means of a convenient adjusting knob.

The counterbalance is used to adjust the sensitivity of the balance and at its most sensitive setting approximately 80% full scale deflection is produced by 0·5 g of powder of specific gravity 1·5 in a liquid of specific gravity 1·0.

STAND

The instrument is assembled on a cast base, 12×10 in fitted with a spirit level and four levelling feet. The vertical rod carrying the sedimentation column assembly is mounted on a slide mechanism incorporating a rack and pinion. Movement of a handwheel raises the sedimentation column clear of the balance pan, so that the pan may be removed for cleaning. The stand, tube support, tank platform and balance casing are finished in a durable stoved enamel. All other metal parts are heavily plated.



OPERATION

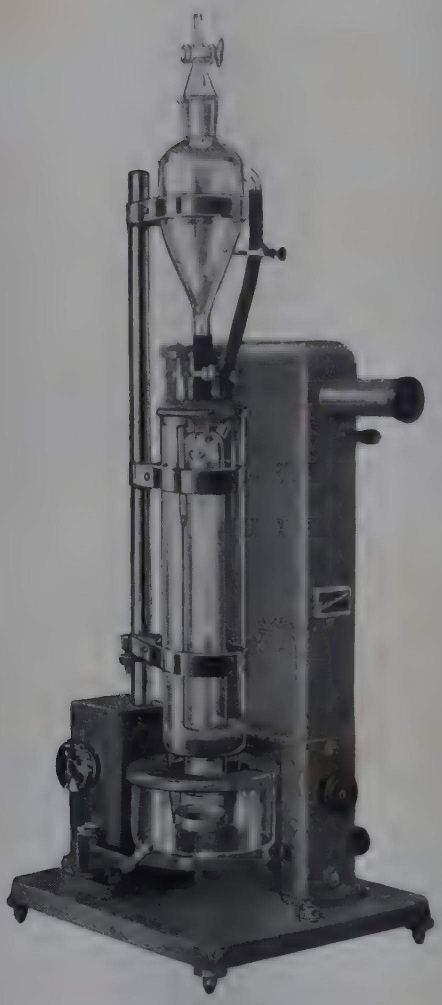
The balance zero is set, the sedimentation column correctly immersed in the receiving tank and the balance is clamped. A uniform dispersion is poured into the sample vessel and the stopper is replaced. The sample is allowed to flow into the sedimentation tube by opening both pinch clips. The clips are closed immediately after entry and a timing device is started. The balance pan is unclamped and scale readings are noted at times increasing by a factor of $\sqrt{2}$ up to 362 min. A simple sedimentation test, run concurrently with the main test, provides a calibration for the balance and does away with the need for continuing the test until sedimentation is complete. The weight-size distribution is readily calculated, knowing the specific gravity of the powder and the specific gravity and viscosity of the dispersing liquid. **An automatic recording attachment is available, see details on next page.**

DISPERSION OF SAMPLES

For satisfactory performance it is essential to prepare a completely dispersed and homogeneous suspension beforehand. There is no universal dispersing agent for powders. Each powder may require separate treatment to determine the best conditions. A useful feature of the instrument, however, is that because it is not necessary to extract, dry and weigh the settled powder no 'blanks' are required and higher concentrations of the dispersing agents can be used without the necessity of applying correction factors.

Gallenkamp SEDIMENTATION BALANCE

(continued)



PC-650

PC-650

SEDIMENTATION BALANCE, *Gallenkamp,* as specification, for particle size determination, with glassware, water jacket thermometer, mixing tube, plastics dust cover and full instructions for use. Requires, but does not include, a reliable 6V source (see BJ-162 or PC-669 below) ... ... Each **£259. 0. 0.** *b*

REPLACEMENT PARTS

PC-656	**Sample container,** with 29/32 socket.	Each	**£1. 18. 0.**	*a*
PC-658	**Stopper,** with 29/32 cone and stopcock.	Each	**£0. 19. 6.**	*a*
PC-660	**Sedimentation tube,** graduated ...	Each	**£2. 8. 0.**	*a*
PC-662	**Water jacket,** without gaskets ...	Each	**£1. 5. 0.**	*a*
PC-663	**Gasket,** top, for PC-662	Each	**£1. 4. 0.**	*b*
PC-664	**Gasket,** bottom, for PC-662 ...	Each	**£1. 4. 0.**	*b*
PC-665	**Receiving tank**	Each	**£0. 14. 3.**	*a*
PC-666	**Torsion wire**	Each	**£5. 16. 0.**	*b*
PC-667	**Lamp,** 6V, 18W, S.B.C.	Each	**£0. 12. 0.**	*m*
PC-668	**Mixing tube,** borosilicate glass, with mark at 225 ml and 29/32 socket. Overall length 35 cm with gradual taper to 15 mm dia at lower end for easy transfer of samples into sample container PC-656	Each	**£1. 11. 0.**	*a*
TJ-380	**Thermometer** for water jacket, scale span 0 to 40C° subdivided in 0·2°C. For price see entry in List No. sequence.			

ACCESSORIES

PC-669	**Transformer,** 6V, 18 VA, totally enclosed. For 200/250V 50/60 Hz single phase supplies.	Each	**£12. 5. 0.**	*c*
	For 100/110V 50/60 Hz single phase supplies.	Each	**£12. 5. 0.**	*cN*

When ordering please state voltage and nature of supply.

BJ-162	**Accumulator,** 2V, 40 A.h. (three required). For price see entry in List No. sequence.

RECORDING ATTACHMENT FOR SEDIMENTATION BALANCE

This attachment enables the balance to be left unattended once the sequence of operations has been started. Consequently determinations can be made at night as well as during the day. The photographic recording method employed has no effect whatsoever on the delicate torsion balance used to weigh the sedimenting sample. Using a changing bag and a simple developing tank, a permanent set of readings can be produced within 10 minutes of unloading the camera. For this processing a darkroom is unnecessary.

RECORDER TIMING UNIT

The electrical impulses required to operate the recording camera are supplied by this unit. The impulses occur at time intervals which increase in the ratio of $\sqrt{2}:1$, the first impulse occurring after $\frac{1}{2}$ min. When the key switch is moved to the start position, timing commences. The elapsed time in minutes is indicated on the counter, up to a maximum of 512 min from the start, when the last exposure occurs and the unit switches itself off. On resetting the unit, both the timing mechanism and the counter return to the start position ready for the next determination.

The 'camera operation' lamp flashes each time the camera operates but remains on should a fault occur in the camera.

AUTO-CAMERA

This is an automatic camera which is operated by a 24V d.c. impulse. It will take up to 200 exposures of 1 × 1 in format on 35 mm film at each loading. The shutter speed is adjustable from 1/10th to 1/200th of a second and includes time and bulb. The camera, supplied without lens, slides over a modified screen tube on the balance and its weight is taken by a simple bracket. The existing balance optical system is used to form an image on the graticule in the focal plane of the camera. A metal hairline just in front of the film provides a reference mark. Film exposure and advance may be carried out independently of the timing unit. An exposed length of film may be removed from the camera for processing in the self-closing cassettes.

PC-680

RECORDER TIMING UNIT, *Gallenkamp,* as specification with coupling cables, for 200/250V 50 Hz single phase supplies only ... ... Each **£168. 0. 0.** *b*

PC-685

AUTO-CAMERA, as specification, with camera mounting accessories, winding key and two cassettes. Each **£130. 5. 0.** *f*

For illustrations see page 576.

ACCESSORIES

PC-686	**Cassette,** for auto-camera	Each	**£1. 9. 0.**	*f*
PC-687	**Changing bag,** black plastics with welded seams.	Each	**£2. 5. 0.**	*m*
PC-688	**Developing tank,** 35 mm, for up to 1·5 m of film.	Each	**£1. 10. 0.**	*m*

NOTE: A transformer PC-669 is required to supply the sedimentation balance lamp.

Items on this page normally available from stock except those coded *N*.

PENCILS

PC-910

PENCILS, *Chinagraph*, for writing on glass and other polished surfaces. Available in brown, red, yellow, green, blue, or black. In boxes of one dozen.
Box **£0.12. 0.** *m*

When ordering please state colour required.

A. GALLENKAMP & CO. LTD.

PC-920

PC-920

COLLET HOLDER, *Chinagraph*. This holder will accept *Chinagraph* refills of 4 mm dia. up to 9 cm long and is economical in use as it avoids sharpening and wasted short ends. Holder only with pocket clip.
Each **£0. 7. 9.** *m*

PC-922 **Refills,** *Chinagraph*, for pencil holder PC-920. Available in red, yellow, green, blue or black. In tubes of one dozen of one colour ... ... Tube **£0. 5. 0.** *m*

When ordering please state colour required.

PC-940

***PC-940**

PENCIL, *All-Stabilo*, for writing on all surfaces including metal, glass, plastics and glossy paper. The opaque, matt black impression is waterproof but is removed easily by wiping with a damp cloth.
Dozen in box **£0.12. 0.** *m*

***PC-942**

PENCILS, *All-Stabilo*, as PC-940 but coloured. In sets of one dozen comprising two each red, yellow, blue, green, black and white in metal box ... Set **£0.12. 0.** *m*

PC-982

TEMPERATURE INDICATING THERMOCHROM PENCILS

These pencils provide a ready means of determination of surface temperature of hot objects. If a mark made with one of the crayons on a hot surface changes colour within 1–2 seconds then the temperature is within ±5°C of that particular crayon. An instantaneous colour change indicates a higher temperature, a slower change a lower temperature. The approx. temperature of any surface can be quickly found by successive trials of several crayons. Alternatively an article being heated to a required temperature can be tested intermittently with the appropriate crayon until the colour change takes place in 1–2 seconds.

Temperature of change °C= Code No.	Original colour	Final colour
65	White	Light blue
75	White	Light green
100	Light beige	Blue
120	White	Light green
150	Ivory	Mauve
175	Mauve	Blue
200	Blue	Black
220	White	Light brown
280	Light green	Black
300	Light green	Mid-green
320	Green	White
350	Light brown	Mid-brown
375	Fawn	Black
420	White	Light brown
450	Light pink	Black
500	Beige	Black
600	Blue	White
670	Green	White

***PC-980**

PENCIL, *Thermochrom*, as specification.
Box of 12 **£3.16. 6.** Each **£0. 7. 6.** *m*

***PC-982**

PENCILS, *Thermochrom*, as specification. Six pencils in any combination of temperature codes, packed in neat pocket case ... ... Set **£2. 9. 6.** *m*

When ordering PC-980 or PC-982 please state temperature code Nos.

***PC-984**

PENCILS, *Thermochrom*, as specification. Set of eighteen pencils covering complete range 65 to 670°C, with pencil holder PC-985, and instructions in work box.
Set **£5. 0. 0.** *f*

***PC-985**

PENCIL HOLDER, aluminium, 15 cm long, to hold *Thermochrom* pencils... ... ... Each **£0. 4. 6.** *f*

GP-225

GLASS WRITING DIAMOND.

GP-230

GLASS WRITING DIAMOND.

For details and prices see entries in List No. sequence.

PENETROMETERS	see	PETROLEUM
PESTLES	see	MORTARS and PESTLES
PETRI DISHES	see	CULTURE

All items on this page normally available from stock.

PETROLEUM AND ALLIED PRODUCTS TESTING APPARATUS

FOREWORD

This section mainly contains apparatus specified in Standard Methods for Testing Petroleum and its Products published by the Institute of Petroleum (IP). References to American Society for Testing Materials (ASTM) methods are made where the apparatus conforms to both specifications, but in many instances the American specification is different if only in minor details and apparatus has to be manufactured specially. References are made also to various standards published by the British Standards Institution (BS) and Standard Tar Products Test Committee (STPTC) where these apply.

Apparatus supplied to a recognised standard will conform to the latest version of the standard, irrespective of our present catalogue specification. This policy will be adhered to rigidly unless we are definitely instructed to the contrary when apparatus is ordered. In order to give the user the benefit of modern trends in design affecting only details which are not included in the standard, we also reserve the right to depart from catalogue specifications by incorporating improvements which increase the convenience and usefulness of apparatus.

STANDARD METHODS

Listing code
IP 13—D 189 indicates **ASTM—IP** joint methods.
IP 34 D 93 indicates technically equivalent methods.
IP 45 (D 6) indicates corresponding methods.

IP No.	ASTM No.	TITLE	Page
IP 2	(D 611) (D 1012)	Aniline point	582
IP 10	(D 187)	Burning test—24 hour	583
IP 12	(D 240)	Calorific value of liquid fuel—bomb calorimeter method	584
IP 13	— D 189	Conradson carbon residue of petroleum products	584
IP 14	— D 524	Ramsbottom carbon residue of petroleum products	585
IP 15	— D 97	Pour point	585
IP 16	— D 2386	Freezing point of aviation fuels	600
IP 17		Colour by Lovibond tintometer	586
IP 19		Demulsification number—lubricating oil	587
IP 20	(D 877)	Electric strength—transformer oil	594
IP 23	— D 322	Dilution of gasoline engine crankcase oils	587
IP 24		Distillation of crude petroleum—preliminary distillation	592
IP 31		Drop point of grease	593
IP 32	(D 113)	Ductility of bitumen	594
IP 33		Flash-point by the Abel apparatus—Petroleum (Consolidation) Act 1928 Method	595
IP 34	— D 93	Flash-point (closed) by the Pensky-Martens apparatus	596, 598
IP 35		Flash-point (open) and fire point by the Pensky-Martens apparatus	598
IP 36	— D 92	Flash and fire point by the Cleveland open cup	599
IP 40	— D 525	Oxidation stability of gasoline (induction period method)	601
IP 45	(D 6)	Loss on heating—bitumen and flux oil	600
IP 49	D 5	Penetration of bitumen	603
IP 50	(D 217)	Penetration of grease	603
IP 53	— D 473	Sediment in crude and fuel oils by extraction	605
IP 55	— D 87	Melting point of petroleum wax (cooling curve)	601
IP 56	(D 1314)	Oxidation test for transformer oil	602
IP 57	(D 1322)	Smoke point	583
IP 58	(D 36)	Softening point of bitumen—ring and ball	593
IP 59		Specific gravity and density	605
IP 60		Specific refractivity	see REFRACTOMETERS
IP 61	— D 129	Sulphur in petroleum products by the bomb method	606
IP 63	(D 1551)	Sulphur content—quartz tube method	606
IP 69	(D 323)	Vapour pressure—Reid method	609
IP 70		Viscosity—Redwood	613
IP 71	— D 445	Viscosity of transparent and opaque liquids (Kinematic and dynamic viscosities)	610
IP 72		Viscosity—cutback bitumen and road oil	612
IP 74	(D 95)	Water content—Dean and Stark method	see WATER DETERMINATION
IP 75	(D 1796) (D 96)	Water and sediment—centrifuge method	614

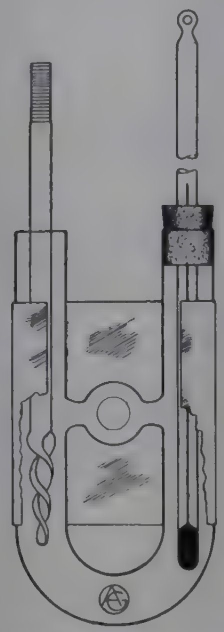
STANDARD METHODS

(continued)

IP No.		ASTM No.	TITLE	Page
IP 96	—	D 526	Lead in gasoline—gravimetric method	608
IP 107	—	D 1266	Sulphur in petroleum products and liquefied petroleum (LP) gases (lamp method)	607
IP 112			Corrosive substances in grease—copper strip test	587
IP 114			Oxidation test for turbine oil	602
IP 116			Tetraethyl lead in gasoline—chlorate oxidation method	608
IP 121		(D 1742)	Oil separation on storage of grease	600
IP 123	—	D 86	Distillation of petroleum products	588, 592
IP 131	—	D 381	Existent gum in fuels by jet evaporation	605
IP 132	—	D 566	Dropping point of lubricating grease	593
IP 133	—	D 127	Drop melting point of petroleum wax including petrolatum	601
IP 136		D 94	Saponifiable and unsaponifiable matter—oils, fats and waxes	605
IP 138	—	D 873	Oxidation stability of aviation fuels (potential residue method)	601
IP 143			Asphaltenes—precipitation with normal heptane	583
IP 145	—	D 1019	Olefinic plus aromatic hydrocarbons in petroleum distillates	583
IP 146	—	D 892	Foaming characteristics of lubricating oils	599
IP 154	—	D 130	Copper corrosion by petroleum products—copper strip test	586
IP 156	—	D 1319	Hydrocarbon types in liquid petroleum products by fluorescent indicator adsorption	600
IP 157	—	D 943	Oxidation characteristics of inhibited steam turbine oils	602
IP 158	—	D 721	Oil content of waxes	600
IP 160		(D 1298)	Specific gravity and density—hydrometer method	605
IP 161		D 1267	Vapour pressure—liquified petroleum gases	609
IP 162			Bitumen content	582
IP 167			Penetration of semi-fluid greases	603
IP 169			Analysis by gas chromatography—petroleum gases	see CHROMATOGRAPHY
IP 170			Flash-point by the Abel apparatus	595
IP 179	—	D 937	Cone penetration of petroleum	603
IP 182			Acidity (inorganic) of petroleum products—colour indicator titration method	608
IP 189		(D 941)	Specific gravity and density—graduated bicapillary pyknometer method	605
IP 190		(D 70)	Specific gravity and density—capillary stoppered pyknometer method	605
IP 191	—	D 216	Distillation of natural gasoline	588, 592
IP 195		D 1078	Distillation range of volatile organic liquids	588, 592
IP 196	—	D 1500	Colour of petroleum products—ASTM colour scale	586
IP 198	—	D 2398	Softening point of asphalt (bitumen) and tar in ethylene glycol (ring and ball)	593
IP 212			Viscosity—bitumen road emulsion	612
IP 219	—	D 2500	Cloud point of petroleum oils	585
—		D 91	Precipitation number of lubricating oils	614
—		D 1321	Needle penetration of petroleum waxes	604
—		D 1403	Cone penetration of lubricating greases	604
—		D 1831	Roll stability of lubricating grease	599
—		E 133	Distillation equipment	588/592
IP		E 1	IP and ASTM thermometers	see THERMOMETERS

STPTC No.	TITLE	
CO 8	Carbon residue—Conradson method	584
LB 15	Total sulphur	608
RT 2	Viscosity	612
RT 3	Equi-viscous temperature (e.v.t.)	611, 612
V 4B	Separating funnel receivers	605
V 4C	Separating funnel receivers	605
V 12	Hubbard specific gravity bottle	605
V 13	Pyknometer	605

BS No.	TITLE	
135	Benzenes and benzoles	608
148	Insulating oil for transformers and switchgear	594, 602
188	Methods for the determination of the viscosity of liquids in c.g.s. units	610
434	Bitumen road emulsion (anionic)	612
598	Sampling and examination of bituminous mixtures for roads and buildings	582, 592
658	Apparatus for the determination of distillation range (including flasks and receivers)	592
756	Dean and Stark apparatus	614
805	Toluenes	608
894	Ubbelohde apparatus for flow and drop points	593



PE-100 with PE-102 and PE-104

ANILINE POINT, IP 2 Method D and ASTM D611

PE-100

U-TUBE, borosilicate glass, with cross tube, diameter 16 mm, height 125 mm, approximately. Each **£1. 4. 6.** *a*

PE-102

SHIELD, metal, to fit U-tube, with 10 mm aperture. Each **£0. 15. 0.** *a*

PE-104

STIRRING ROTOR, glass, auger shaped. Each **£0. 7. 6.** *a*

SS-530	**Stirrer,** *Gallenkamp*...	For details and prices see entries in List No. sequence.
TK-531	**Thermometer,** IP 20C, Aniline Point Low	
TK-533	**Thermometer,** IP 21C, Aniline High	

BITUMEN CONTENT. IP 162 Method A and BS 598 PART 3 Method A. Assembly comprising components listed below.

COMPONENTS

PE-107	**Beaker,** aluminium, 600 ml, with aluminium cover.	Each **£0. 9. 0.**	c
PE-108	**Funnel,** glass, 20 cm dia. top edge ground flat.	Each **£0. 13. 0.**	a
PE-109	**Plate,** glass, 22·5 cm dia. with 16 mm hole at centre.	Each **£0. 8. 9.**	c

FP-240	**Funnel,** glass, 10 cm diameter ...	For prices see entries in List No. sequence.
RT-200	**Stirring rod,** glass	
BT-180	**Bottle,** Winchester pattern, 2500 ml	

BITUMEN CONTENT. IP 162 Method D, BS 598 PART 3 Method D and Road Research Laboratory Road Note No. 10.

PE-110

PE-110

SIEVING EXTRACTOR, for simultaneous extraction of bitumen and sieving of aggregate. Total capacity 3 litres and accommodates six sieving rings. The head is attached to the shaking frame by a quick release fitting and is shaken at 2 Hz through an angle of approximately 35°. Supplied with 8 in head with draincock, retaining clamps and top cover but without sieving rings. For 200/240V a.c. single phase supplies ... ... Each **£104. 15. 0.** *fN*

ACCESSORIES

PE-112 **Sieve head** complete with top cover. Additional for above machine, for continuous operation, one in action on the machine while the other is unloaded, cleaned and reloaded with the next sample ... Set **£15. 16. 3** *fN*

PE-113 **Sieving ring,** 8 in dia. × 1 in deep with sealing ring.

Mesh No.	14	25	52	100	200	
All, Each			**£5. 15. 6.**			*fN*

REPLACEMENT PART

PE-116 **Sealing ring,** for 8 in sieving ring. Dozen **£1. 18. 0.** Each **£0. 4. 7.** c

Items on this page normally available from stock except those coded ***N.***

OLEFINIC PLUS AROMATIC HYDROCARBONS IN PETROLEUM DISTILLATES, ASTM D1019-IP 145

PE-120

SULPHONATION FLASK, *Technico*, standard, with ground stopper, capacity to zero graduation about 45 ml, neck graduated 0–100% in 2% divisions.
Each £1. 5. 0. *a*

PE-124

SHAKING MACHINE, accommodates four standard sulphonation flasks in individual cooling jars. Flasks are mounted at an angle of 45° and shaken at 250 ±25 cycles/min with a horizontal stroke of approximately 7·5 cm. Supplied with four screw top cooling jars but **without sulphonation flasks.** For 240/250V 50 Hz single phase supplies ... ... Each £90. 0. 0. *fN*

PH-900	**Centrifuge,** for sulphonation flasks.	For details and prices see entries in List No. sequence.
PH-904	**Centrifuge bucket,** to take flasks PE-120	

ASPHALTENES—PRECIPITATION WITH NORMAL HEPTANE, IP 143

PE-140

EXTRACTOR, Ⓐ, borosilicate glass, with 24/29 cone and 34/35 socket.
Dozen £14. 10. 0. Each £1. 6. 6. *a*

FJ-058	**Flask,** conical, borosilicate glass, 250 ml	For details and prices see entries in List No. sequence.
Q-C5/25	**Condenser, Davies,** double surface, borosilicate glass, 20 cm jacket, with 34/35 cone	

BURNING TEST—24 HOUR, IP 10 and ASTM D187

PE-160

STANDARD LAMP, complete with three borosilicate glass chimneys and a packet of 10 wicks.
Each £7. 5. 0. *f*

REPLACEMENT PARTS

PE-162	**Chimney,** borosilicate glass.	Pack of 3	£1. 16. 0.	*f*
PE-164	**Wicks,** ¾ in wide.	Pack of 10	£0. 8. 0.	*f*

ACCESSORY

PE-166 **Flame gauge,** for use in conjunction with lamp PE-160.
Each £25. 0. 0. *fN*

SMOKE POINT OF JET FUELS ASTM D1322 SMOKE POINT, IP 57

PE-170

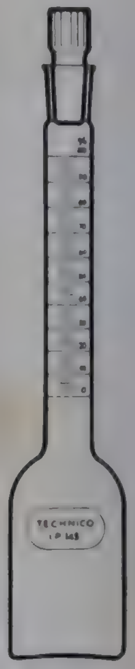
STANDARD LAMP, comprising lamp body, candle socket, candle, on stable tripod stand. The lamp body, enamelled matt black, has a polished black scale marked in white. The candle socket has a smooth height adjustment ... ... Each £28. 0. 0. *fN*

PE-172

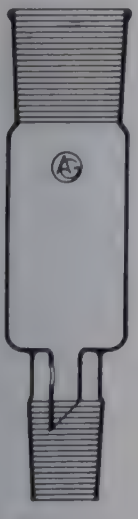
CASE, to contain lamp assembly, tripod stand and five additional candles ... ... Each £7. 10. 0. *fN*

REPLACEMENT PARTS

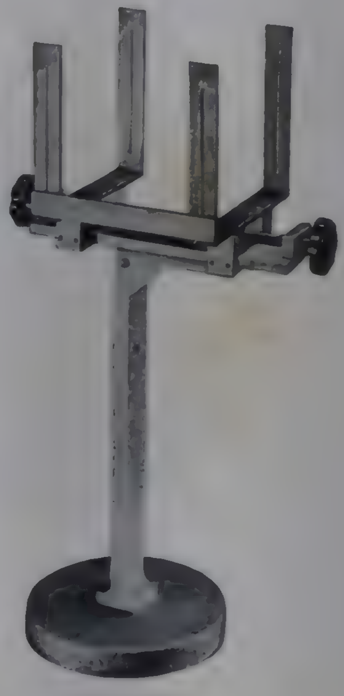
PE-174	**Candle**	Each	£8. 0. 0	*fN*
PE-176	**Wick**	Pack of 50	£1. 0. 0.	*c*



PE-120


PE-140

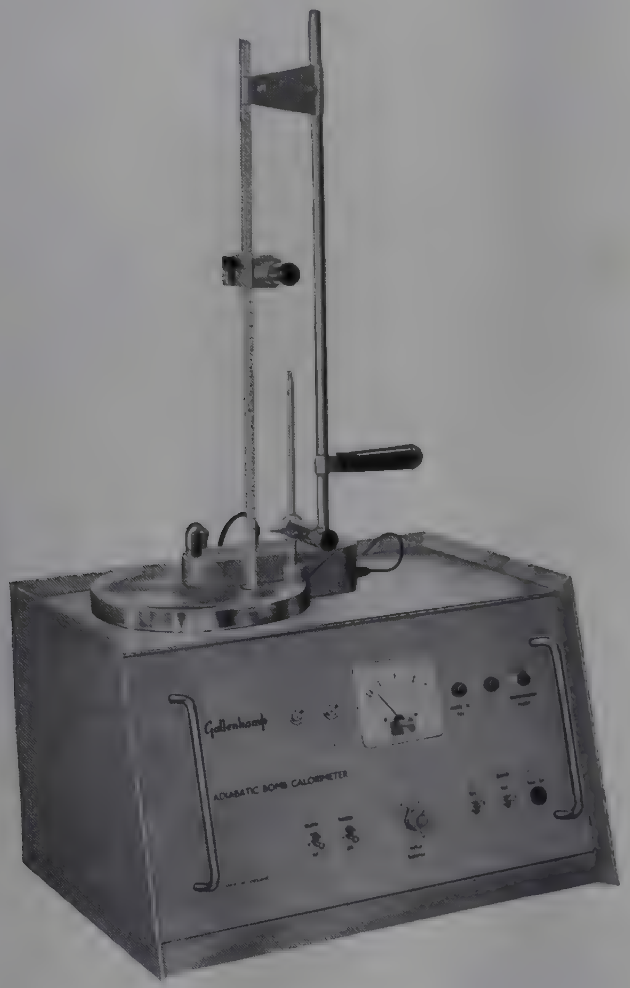
PE-160


PE-166

PE-170
PE-172

Items on this page normally available from stock except those coded *N*.

Gallenkamp AUTOBOMB

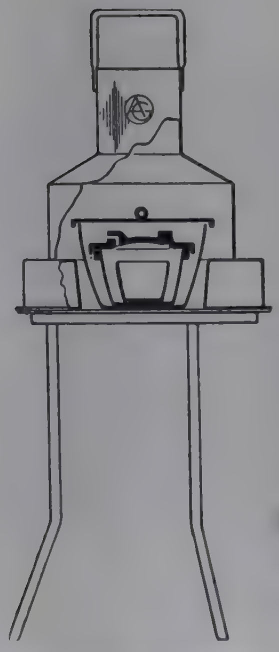


CB-100

CALORIFIC VALUE OF LIQUID FUEL—BOMB CALORIMETER METHOD, IP 12. ASTM D240, ASTM D2382.

- Top cover assembly on telescopic lift—no dismantling between tests.
- No handling of calorimeter thermometer—risk of breakage negligible.
- Instantaneous heaters for accurate response.
- High speed water circulation through jacket and cover for temperature uniformity.
- Console encloses calorimeter and all control circuits, cables and water connections.
- Firing wire continuity tester circuits give visual indication of successful firing.
- Swing down control panel for immediate access for servicing.
- Printed circuit for reliability.
- Includes exclusive illuminated reader/vibrator for thermometer.

For full details see CB-100 to CB-353 in List No. sequence.



Conradson assembly
PE-200 et seq.

CONRADSON CARBON RESIDUE OF PETROLEUM PRODUCTS ASTM D189-IP 13, STPTC C08

Assembly comprising components listed below:

COMPONENTS

PE-200	**Hood,** spun steel	Each	**£2. 5. 0.**	*f*
PE-202	**Insulator,** hollow steel box ...	Each	**£3. 0. 0.**	*f*
PE-206	**Crucible, Skidmore, with cover,** cast iron, diameter 55 mm, height 38 mm	Each	**£1.18. 0.**	*f*
PE-208	**Wire triangle,** nickel chromium, 6·3 cm side.	Each	**£0.10. 0.**	c
BX-045	**Meker burner,** diameter of flame 25 mm	For details and prices see entries in List No. sequence.		
CW-210]	**Crucible,** *Royal Worcester* porcelain, size 1 shape A, diameter 49 mm, capacity 28 ml			
CW-360	**Crucible,** sheet iron, with cover, size 80 × 60 mm			
GR-100	**Glass balls,** diameter about 3 mm.			
SM-915	**Tripod stand,** height 20 cm, diameter 12·5 cm			

All items on this page normally available from stock.

RAMSBOTTOM CARBON RESIDUE OF PETROLEUM PRODUCTS
ASTM D524 - IP 14

PE-220

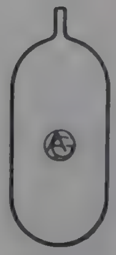
PE-220

HEATING BLOCK, electrically heated, with accurate temperature control. Comprises a solid cylindrical metal block with six wells. The block is heated by elements clamped to the outside and mounted in a well lagged case. A built-in indicating temperature controller operates from a thermocouple in the block. For 240V a.c. single phase supplies ... ... Each **£215. 10. 0.** *fN*

When ordering please state voltage and nature of supply.

REPLACEMENT PART

PE-222 **Control bulb,** with thermocouple but without pyrometer ... ... Each **£6. 12. 6.** *fN*


PE-230

PE-230

COKING BULB, Ⓐ, borosilicate glass, to ASTM D 524-IP 14. In cartons of 12.

12 cartons **£23. 10. 0.** Carton **£2. 3. 0.** *a*

POUR POINT, ASTM D97 - IP 15
CLOUD POINT OF PETROLEUM OILS, ASTM D 2500 - IP 219

PE-254

PE-254

CLOUD AND POUR POINTS BATH, 6-test, comprising cylindrical copper tank, 23 cm diameter, depth 16·5 cm, on three feet, with loose copper cover fitted with six pockets and cork disks to take standard test jars, and central thermometer tubulure. **Without test jars, gaskets or thermometers.**

Each **£30. 10. 0.** *b*

ACCESSORIES AND REPLACEMENT PART

PE-260 **Test jar,** borosilicate glass, internal diameter 32 mm, overall length 120 mm, with marks at 51 mm and 57 mm from the bottom, fitted with cork.
Dozen **£2. 19. 0.** Each **£0. 6. 2.** *a*

PE-262 **Cork ring gasket,** for test jar. Pack of 10 **£0. 4. 6.** *c*

PE-264 **Cork disks,** spare, for bottom of test bath pockets.
Pack of 10 **£0. 7. 6.**

TK-502 **Thermometer,** IP 1F Cloud and Pour
TK-503 **Thermometer,** IP 1C Cloud and Pour
TK-504 **Thermometer,** IP 2F Cloud and Pour
TK-505 **Thermometer,** IP 2C Cloud and Pour

For full details and prices see entries in List No. sequence.

MULTIPLE TEST REFRIGERATED CLOUD AND POUR POINT EQUIPMENT

The equipment consists of three independently controlled baths each with six sleeves for Cloud and Pour Point test jars. The baths operate at 30 to 35°F, 0 to + 5°F and —25 to —35°F respectively.

Details and prices on application.

Items on this page normally available from stock except those coded *N*.

PE-340 with test jars

COLOUR BY THE LOVIBOND TINTOMETER IP 17

CT-006	Tintometer, Lovibond, with accessories.	For full details and prices see entries in List No. sequence.
CT-016	Tintometer, Lovibond, Model AF704.	

ASTM COLOUR OF PETROLEUM PRODUCTS ASTM D1500-IP 196

PE-340

COLOUR COMPARATOR, *Seta-Lovibond,* for determining the colour of a wide variety of petroleum products such as lubricating oils, diesel oils and petroleum waxes. The metal housing contains an adjustable light source with daylight filter, open glass screen and front mounted angled optical eyepiece which splits the field of view into two sections, one accepting light transmitted by the sample and the other light passed by the colour standards. Sixteen colour standards are mounted in a rotating turret. The viewing angle is adjustable. **Without test jars** ... ... Each **£115. 0. 0.** f

When ordering please state voltage and nature of supply.

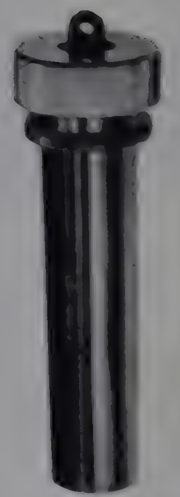
ACCESSORIES

PE-342	Mahogany case	Each £6. 15. 0.	f
PE-343	Sample container, for referee work.	Each £0 8. 0.	f
PE-260	Cloud and Pour test jar, for routine work. For full details and prices see entry in List No. sequence.		

REPLACEMENT PART

PE-346	Lamp, colour temperature 2750°K.	Each £0. 2. 6.	fS

When ordering please state voltage and nature of supply.



PE-360

COPPER CORROSION BY PETROLEUM PRODUCTS—COPPER STRIP TEST, ASTM D130-IP 154

PE-360

LOW PRESSURE BOMB, for pressures up to 100 lb/in^2, internal diameter 32 mm, internal height 184 mm ... ... Each **£16. 10. 0.** f

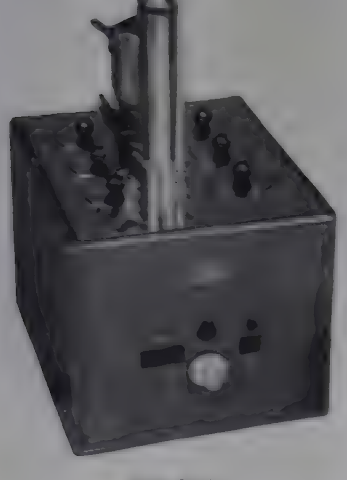
REPLACEMENT PART

PE-362	'O' ring seal	Pack of 10 £1. 0. 0.	f

PE-366

DUAL PURPOSE WATER BATH, comprises tank to hold 6 bombs or 18 test tubes, surrounded by an enamelled case, adjustable thermostat, immersion heater, stirrer and condenser. The switching system allows for either boiling or control at 122°F, the condenser preventing excessive loss of water. Six covers with support hooks locate in the chromium plated top. For 200/250V 50 Hz single phase supplies... ... Each **£95. 0. 0.** f

When ordering please state voltage and nature of supply.



PE-366

ACCESSORIES

PE-370	Copper strip vice, for one strip only.	Each £9. 10. 0.	f
PE-371	Copper strip vice, for five strips.	Each £14. 0. 0.	f
PE-372	Flat test tube, for examining copper strips, pack of ten.	Pack £5. 0. 0.	fS
PE-376	Copper strips, 3 in. long, $\frac{1}{2}$ in. wide, $\frac{1}{32}$ in. thick, pack of ten	Pack £1. 10. 0.	fS
TF-180	Test tube, borosilicate glass, 25 mm diameter, 150 mm long	For full details and prices see entries in List No. sequence.	
TK-616	Thermometer, IP 64F, Specific Gravity, wide range		
TK-617	Thermometer, IP 64C, Density, wide range		

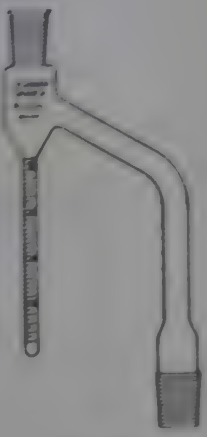
Items on this page coded S normally available from stock.

CORROSIVE SUBSTANCES IN GREASE COPPER STRIP TEST IP 112

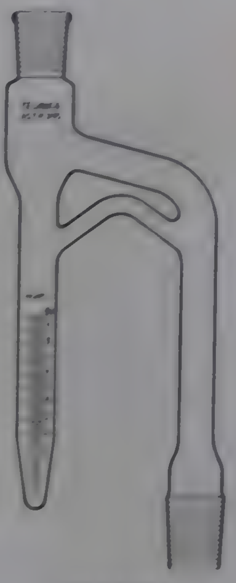
BJ-625	Beaker, 100 ml, tall form	For details and prices see entries in List No. sequence.
PE-370	Copper strip vice, for one strip ...	
PE-371	Copper strip vice, for five strips...	
PE-376	Copper strips	

DEAN AND STARK APPARATUS
IP 74 and ASTM D95

See WJ-130 to WJ-230 in List No. sequence.



WJ-150



WJ-175

DEMULSIFICATION NUMBER OF LUBRICATING OIL, IP 19

PE-500
DEMULSIFICATION APPARATUS, comprising two glass beakers fitted with copper covers, graduated oil container, steam generator, with glass delivery tubes, rubber connections, screw clips and corks. **Without thermometers** ... ... Each £9. 10. 0. *b*

REPLACEMENT PARTS

PE-502 **Beaker,** glass, outside diameter 16·5 cm, height 23 cm, capacity 3·25 litres, for separating and emulsifying baths. Each £2. 0. 0. *c*

PE-504 **Oil container,** *Technico*, length 200 mm, inside diameter 23 mm graduated 10 to 50 cm³, subdivided in 1 cm³ and ringed every 5 cm³ ... ... Each £0. 18. 6. *a*

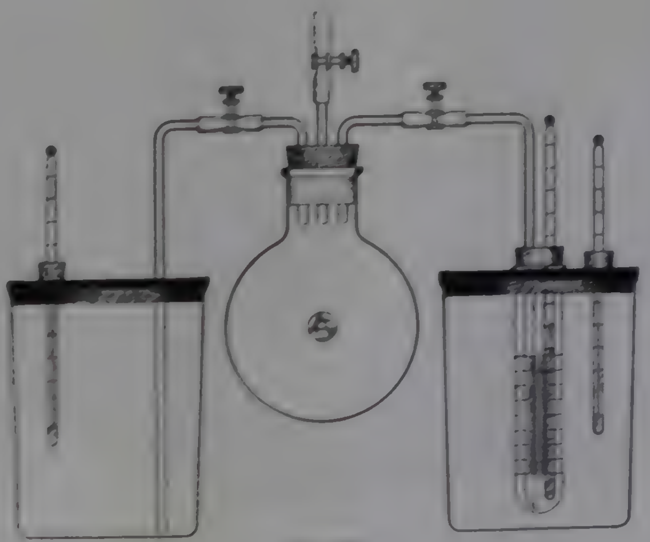
FJ-128 **Flask,** 1 litre used as steam generator. For price see entry in List No. sequence.

ACCESSORIES

TK-506 **Thermometer,** IP 3F Demulsification.
TK-507 **Thermometer,** IP 3C Demulsification.
Thermometers for separating and emulsifying baths (two required) are as follows:
TJ-050 **Thermometer,** −10 to 110°C, for use with demulsification thermometer IP3C.
TJ-052 **Thermometer,** 0 to 240°F, for use with demulsification thermometer IP3F.

For details and prices see entries in List No. sequence.

For suitable **stands and clamps** see STANDS AND CLAMPS.



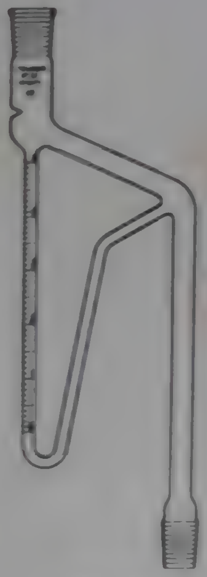
PE-500

DILUTION OF GASOLINE ENGINE CRANKCASE OILS ASTM D322-IP 23

PE-550
CONDENSER, Liebig, borosilicate glass, 40 cm, with 24/29 cone ... Dozen £12. 5. 0. Each £1. 2. 6. *a*

PE-552
DILUENT TRAP, *Technico*, 5 cm³ subdivided in 0·1 cm³, with 24/29 cone and socket.
Dozen £25. 10. 0. Each £2. 6. 0. *a*

Q-FRIL/35 FLASK, 1000 ml, short neck with 24/29 socket. For price and details see QUICKFIT APPARATUS.



PE-552

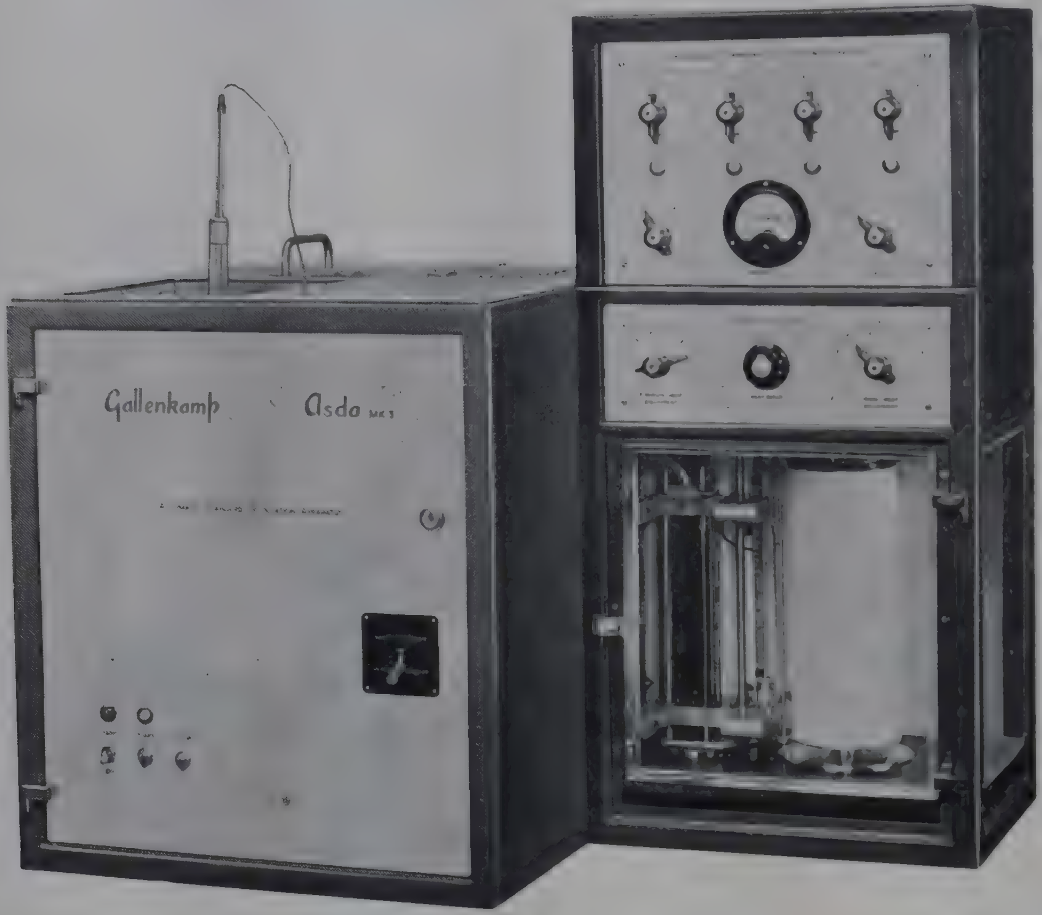
All items on this page normally available from stock.

Gallenkamp REGD. TRADE MARK **ASDA** REGD. TRADE MARK

AUTOMATIC STANDARD DISTILLATION APPARATUS

AN ALL-MAINS ROBOT WHICH AUTOMATICALLY PERFORMS STANDARD DISTILLATION TESTS

(Designed in collaboration with Shell Refining Co. Ltd., Stanlow)



PE-700

- **Routine testing of solvents, gasolines, aviation and motor fuels, gas oils, fuel oils, etc. with boiling vapour temperatures up to 400°C (760°F)**
- **Suitable for Joint standard methods ASTM D86-IP 123, Groups 1, 2, 3 and 4, also IP 195, ASTM D1078, DIN 51751 and DIN 51752**
- **Accuracy and reproducibility are well within the limits specified**
- **Operator fatigue and personal errors are eliminated**
- **Designed for continuous operation over extended periods**

The components and materials of *Asda* are carefully selected to ensure the required high standards of reliability and performance. Measurement of vapour temperature is by a thermocouple of dynamic characteristics equivalent to those of a mercury-in-glass thermometer under test conditions. Instrument heat is dispersed by an internal ventilating fan. All inter-connections between electrical assemblies are by multi-pin plugs and sockets with long leads to facilitate servicing. The assemblies themselves are standard and therefore interchangeable for replacement purposes. A hinged control unit cover enables examination of the electrical components without interrupting or delaying a distillation.

Distillation tests when carried out manually are both lengthy and tedious, and consequently are less reliable in practice than the methods themselves might indicate.

Asda carries out the tests automatically: it is, in short, a robot which, having been correctly programmed for a particular product, will faithfully carry out the standard test and give all the required test data.

Test data include:

- Correction temperature
- Initial boiling temperature
- Time taken to reach initial boiling point
- Vapour temperature/volume recovery curve
- Time from initial boiling point to final heat adjustment
- Final boiling point (end point)
- Time taken to reach final boiling point
- Total percentage volume recovered

A feature of the apparatus is the continuous and accurate control of the distillation at the specified volume per unit time by monitoring the rate of rise of the distillate meniscus and adjusting the flask heater voltage accordingly. This is an operation very difficult to achieve manually without considerable experience.

Asdas **have already been supplied to about 100 refineries all over the world, and in one laboratory alone, 80,000 tests were made in 8 months on a bank of fifteen** *Asdas*. The preliminary charging and instruction of the instrument are completed in a few simple and rapid operations. Then the instrument takes over completely and produces all the test data called for by the standard methods to the accuracies specified. One operator can simultaneously supervise a number of separate *Asdas*.

Gallenkamp ASDA

REGD. TRADE MARK

(continued)

OPERATION

The apparatus is charged and programmed, the start switch is depressed and the standard test then proceeds automatically. The heater is switched on and, after two minutes, the pen is momentarily placed on the chart to record Correction Temperature. After five minutes the heat is, for products other than gas oils, reduced by a preselected fraction to avoid boiling over. When the first drop of distillate leaves the condenser tube, the receiver moves against the tip of the condenser and the pen records Initial Boiling Point on the chart. Thereafter, as distillation proceeds, a continuous curve is produced on the chart of temperature against volume recovered. (The standard temperature recorder supplied has dual ranges 0–300°C (32–580°F) and 0–400°C (32–760°F). An alternative narrow range temperature adapter is listed for testing narrow boiling range products).

The rate of recovery is controlled at 4·5 cm³/min using a 100 cm³ receiver, by means of a master timing-motor which, through suitable gearing, controls the input of the heater. Towards the end of the test a final heat adjustment occurs at a preselected volume recovery. When Final Boiling Point is reached, the heater switches off and, after a drainage period, the pen leaves the chart and returns to its zero position. The distillation is now complete, and an internal air blower is automatically switched on to cool the heater compartment for the next run. A facility socket is provided for use at this stage to sound an end-of-test alarm.

A device is incorporated to prevent the subsequent test being started until the heat input is returned to zero and another to prevent hesitation points prematurely ending the test.

The condenser bath can be controlled thermostically at any selected temperature between 20° and 100°C.

TEST SELECTION

Two switches on the front of the apparatus are used to determine the cycle of operations appropriate to each test.

Select test switch

Position 1—ASTM D86–IP 123 Groups 1, 2 and 3, and D1078, IP 195, and DIN 51751 and 51752.
Position 2—ASTM D86–IP 123 Group 4.
Position 3—Rapid distillation (non standard).

NOTE: Position 3 provides facility for a rapid test by omitting heater control which is not essential in the distillation of narrow boiling range fractions. Tests may then be completed in as little as 20 minutes.

Stop test switch

This provides choice of four alternative terminations of test.

1. Final boiling point.
2. Dry point (used only when dry point detector is incorporated).
3. Preselected temperature.
4. Preselected recovery.

SITE REQUIREMENTS AND SERVICES

The *Asda* should be sited on a firm level bench (or floor, in the case of refrigerator or trolley mounted instruments). Electrical supply voltage must not vary by more than ±10% of the stated value. Ambient temperature must not exceed 20°C (68°F) unless the refrigerator is used, in which case the ambient temperature must be below 35°C (95°F). See also **Refrigerator** under ACCESSORIES.

The apparatus is normally bench mounted and occupies a space of 100 × 65 cm. Alternatively it may be mounted on trolley PE-703. Rear access is required for servicing.

Electricity

Voltage:	100/125V or 200/250V a.c. mains
Frequency:	50 or 60 Hz
Power:	*Asda* 2·5 kW (including accessories) Refrigerator 4·5 kW starting 900W running

NOTE: Should mains supply voltage fluctuate by more than ±10% a constant voltage transformer may be required.

Water

A supply of cooling water not above 10°C and a drain are required for the condenser bath, **except when a refrigerator is included in the apparatus set.** In locations of high ambients the instrument should preferably be used in an air-conditioned room. Where this is not possible, accessory PE-753 Receiver Compartment Cooler is available to maintain a constant temperature in the receiver compartment. This accessory can be connected to a cooling water supply of a suitable temperature, or alternatively water from the condenser bath may be circulated by means of pump. For suitable pump see WM-080 in List No. sequence.

INSTALLATION

The proper performance of *Asda* depends on the instrument being correctly installed, on the operating personnel being fully famillar with the programming and controls, and also on adequate routine maintenance.

When ordering, it is strongly recommended that our specialist engineer (or one, if available, from our Distributor) **be required to install the instrument and instruct the personnel responsible for operating and maintenance.**

Installation, testing and personnel instruction requires several days to complete and a **quotation is normally submitted when the ultimate destination of the *Asda* is known.**

Asda is in use in countries all over the world so leading to substantial variations in engineers time and travelling expenses which thus cannot be reasonably included in the List price of the instrument.

MAINTENANCE

When ordering, users are recommended to include and hold on site at least the stand-by spares kit PE-726 and test instruments EE-840 and EF-628.

Gallenkamp ASDA

REGD. TRADE MARK

(continued)

ACCESSORIES

PE-750

REFRIGERATOR

For standard methods the temperatures of the condenser bath and receiver compartment must be controlled within certain limits. It is also necessary to restrict the temperature of the latter to 25°C for the photocells to function satisfactorily. The *Asda* refrigerator satisfies these conditions as well as providing cooled storage for samples. It has sufficient capacity for two *Asdas* in ambient temperatures up to 27°C or one *Asda* in ambients up to 35°C. Since the load on the refrigerator varies with the type of product being tested, it is sometimes possible to cool two *Asdas* using one refrigerator in ambient temperatures above 27°C. For example, if one *Asda* is to be used for gasolines and the other for gas oils (for which the bath is not continuously cooled), then one refrigerator will be sufficient for ambients up to 35°C.

The refrigerator incorporates a sealed unit which cools a tank containing ethylene glycol solution. This solution is pumped by an electric immersion pump (having a brushless, sealed-bearing a.c. motor) to the bath and receiver compartment of the *Asda*.

Heat is removed from the receiver compartment by means of the receiver compartment cooler, which receives coolant from the refrigerator. The cooler is a heat exchanger and air blower combined, the temperature of the receiver compartment being controlled by a hydraulic thermostat. The cooler replaces the rear panel of the receiver compartment. Hoses carrying the coolant are of plastics encased in cellular rubber.

PE-736

DRY POINT DETECTOR

This is a plug-in photoelectric device for monitoring the base of the flask to terminate the test at the Dry Point specified in ASTM D1078, and IP 195.

A beam of light from a lamp underneath the heater compartment passes through the flask to a photocell. During the distillation, while liquid remains in the flask, the light beam is deflected away from the photocell. When the Dry Point is reached, the light path is unobstructed and light falls on the photocell, a relay is energised and the test is terminated.

NARROW TEMPERATURE RANGE ADAPTER

A plug-in replacement for the normal thermocouple potentiometer panel gives full chart temperature spans of 10°C, 15°C or 30°C. This is essential where boiling ranges are narrow, as in the case of SBPs or pure solvents, where, for example, deviations of less than 1°C are significant. Instead of a thermocouple, the sensing element is a platinum resistance thermometer used as one arm of a Wheatstone bridge; this system is responsive to rapid temperature changes. The unit is supplied with six specified ranges, but additional ranges to a total of ten can be supplied to special order.

DIMENSIONS AND WEIGHTS

ASDA	
Overall dimensions	94 × 66 × 86 cm
Net weight	141 kg
Refrigerator	
Overall dimensions	97 × 66 × 84 cm
Net weight	126 kg

Gallenkamp ASDA
REGD. TRADE MARK

(continued)

PE-700

AUTOMATIC STANDARD DISTILLATION APPARATUS, *Asda, Gallenkamp,* as specification, including tool kit PE-780 and instructions for assembly, operation and maintenance, **but not including flasks, receivers, charts and heater boards.** For 100/125V and 200/250V 50 or 60 Hz a.c. single phase supplies with earthed (grounded) neutral ... Each **£1750. 0. 0.** *gN*

(Packing and carriage extra outside the U.K.)

When ordering please state voltage, frequency and nature of supply.

PE-703

TROLLEY, for floor mounting one *Asda*. Consists of tubular steel frame on castors ... Each **£18. 0. 0.** *gN*

PE-708

WORKING KIT of flasks, receivers, charts and heater boards for initial operation, comprises twelve 125 ml flasks PE-797, six 100 ml receivers PE-710, one set of heater boards PE-714, 500 charts 0–300°C PE-718 or 32–580°F PE-722: **(please state which are required),** and 500 charts 0–400°C PE-720 or 32–760°F PE-724: **(please state which are required).** Pack **£39. 0. 0.** *g*

COMPONENTS

PE-710	**Receiver**, 100 ml.	Dozen **£34. 0. 0.**	Each **£3. 2. 0.**	*g*
PE-712	**Thermocouple.**	Dozen **£39. 0. 0.**	Each **£3. 10. 0.**	*g*
PE-714	**Asbestos boards,** 150 × 150 mm with centre and fixing holes.			

Dia. of hole	32	38	50 mm	
Dozen	**64/–**	**64/–**	**64/–**	*g*
Each	**6/6**	**6/6**	**6/6**	

PE-716	**Heater assembly**		Each **£8. 15. 0.**	*g*
PE-717	**Heater element,** replacement for PE-716.		Each **£0. 15. 0.**	*g*
PE-718	**Charts,** range 0–300°C.	Dozen boxes **£14. 10. 0.**	Box of 100 **£1. 6. 6.**	*g*
PE-720	**Charts,** range 0–400°C.	Dozen boxes **£14. 10. 0.**	Box of 100 **£1. 6. 6.**	*g*
PE-722	**Charts,** range 32–580°F.	Dozen boxes **£14. 10. 0.**	Box of 100 **£1. 6. 6.**	*g*
PE-724	**Charts,** range 32–760°F.	Dozen boxes **£14. 10. 0.**	Box of 100 **£1. 6. 6.**	*g*
PE-797	**Flask,** 125 ml to ASTM D86—IP 123 and ASTM E133. For price see entry in List No. sequence.			

PE-726

STAND-BY SPARES KIT, recommended, consisting of one heater element, one thermocouple, one Variac contact, one slidewire contact, three 240V relays, one 48V relay, two mains indicator lamps, two exciter lamps, two indicator lamps, one photocell, three 1A fuselinks, three 7·5A fuselinks ... ... Kit **£14. 5. 0.** *m*

Recommended test instruments

EE-840	*Avometer,* **Model 8,** *for general servicing and setting photocell currents...*	For details and prices see entries in List No. sequence.
EF-628	**Potentiometer,** *Cambridge,* **for calibrating temperature recorder** ...	

PE-730

NARROW TEMPERATURE RANGE ADAPTER, as specification on previous page with six calibrated ranges which must be specified when ordering. Supplied with one platinum resistance thermometer but **without charts** ... ... Each **£126. 0. 0.** *gN*

ACCESSORIES

PE-731	**Additional ranges,** up to a total of ten ranges. **Must be ordered with PE-730.** Please specify ranges required.	Price on application	
PE-732	**Platinum resistance thermometer,** spare, for use with PE-730	Each **£8. 10. 0.**	*gN*
PE-733	**Charts,** narrow range, 10°C span, for use with PE-730.	Box of 100 **£1. 6. 6.**	*g*
PE-734	**Charts,** narrow range, 15°C and 30°C span, for use with PE-730	Box of 100 **£1. 6. 6.**	*g*

PE-736

DRY POINT DETECTOR, as specification on previous page, a plug-in photoelectric device for monitoring the base of the flask to terminate the test at the dry point specified in ASTM D1078 and IP 195. Requires but **does not include 200 ml flasks** ... Each **£78. 10. 0.** *gN*

ACCESSORY

PE-798 **Flask,** 200 ml, to ASTM E133 and IP 195. For price see entry in List No. sequence.

PE-750

REFRIGERATOR, for two *Asdas*, as specification on previous page. Complete with two receiver compartment coolers, coolant couplings and one charge of coolant. Each **£528. 0. 0.** *gN*

PE-751

REFRIGERATOR, for one *Asda*, as specification on previous page. With one receiver compartment cooler, coolant couplings and one charge of coolant. Each **£460. 0. 0.** *gN*

PE-753

RECEIVER COMPARTMENT COOLER, with coolant hoses, to convert PE-751 to PE-750 for working a second *Asda* ... ... Each **£74. 10. 0.** *gN*

PE-754

RECEIVER COMPARTMENT COOLER, as PE-753 but without hoses, for use with cooling water supplies. Each **£68. 10. 0.** *gN*

WM-080	**Water pump,** electrically driven for circulating iced water from the condenser bath through the receiver compartment cooler. For price see entry in List No. sequence.		
PE-755	**Adapter,** for WM-080	Each **£3. 5. 0.**	*g*

When ordering please state voltage and nature of supply.

PE-775

INSTRUCTION MANUAL, additional copies. Each **£1. 15. 0.** *b*

PE-780

MAINTENANCE KIT, for *Asda*, comprising hexagon key set, open end spanner set, tubular spanner set, screwdriver, slidewire contact key, lubricating oil, anti-scuffing paste, Kilopoise grease, Electrolube, and bag of assorted screws, nuts and washers. Kit **£4. 5. 0.** *m*

Items on this page normally available from stock except those coded *N*.

PE-783

PE-786 with PE-791

PE-790

DISTILLATION OF CRUDE PETROLEUM—PRELIMINARY DISTILLATION, IP 24

DISTILLATION OF PETROLEUM PRODUCTS ASTM D86-IP 123

DISTILLATION OF NATURAL GASOLINE ASTM D216 - IP 191

DISTILLATION RANGE OF VOLATILE ORGANIC LIQUIDS IP 195, ASTM D1078

DETERMINATION OF DISTILLATION RANGE, BS 658

PE-783

SHIELD, for gas heating. Stove enamelled and lined internally with asbestos. Supplied with asbestos shelf with 10 cm hole and three 15 cm square asbestos boards with 32 mm, 38 mm and 50 mm holes, respectively. **Without burner** ... ... Each **£14. 4. 3.** *fN*

REPLACEMENT PARTS

PE-784 **Asbestos boards, 15 cm square with centre hole.**

Diam. of hole	32	38	50 mm	
Each	**4/9**	**4/9**	**4/9**	*f*

ACCESSORIES

BX-075 **Burner, gas, suitable for above.**
BX-420 **Burner, LPG, 13 mm tube, suitable for above.**
For prices and details see entries in List No. sequence.

PE-786

SHIELD, as PE-783 but electrically heated by adjustable radiant type element. The heater is controlled by a variable transformer with an ON/OFF switch and an indicator lamp. For 110V or 240V a.c. single phase supplies Each **£37. 14. 3.** *fN*

REPLACEMENT PARTS

PE-787 Heater ... ... Each **£1. 5. 9.** *fN*
PE-784 Asbestos boards. See entry in List No. sequence.

When ordering please state voltage and nature of supply.

PE-790

CONDENSER, straight type, IP 123, BS 658 Type 3, with polished nickel plated, single walled, condenser tank on stove enamelled stand ... Each **£11. 10. 0.** *fN*

PE-791

CONDENSER, single spiral type, with polished nickel plated condenser tank with stove enamelled aluminium box stand ... ... Each **£17. 10. 0.** *fN*

PE-792

CONDENSER, Liebig, BS 658 Type 1 and STPTC C1, borosilicate glass, with bent end and rubber connections, overall length about 600 mm ... Each **£1. 7. 6.** *a*

REPLACEMENT PARTS

PE-793 Inner tube ... ... Each **£0. 9. 3.** *a*
PE-794 Jacket ... ... Each **£0. 18. 0.** *a*

PE-795

CONDENSER, air, BS 658 Type 2 and STPTC C3, borosilicate glass, length 600 mm ... Each **£0. 8. 3.** *a*

PE-797

FLASK, distillation, 125 ml to ASTM D86-IP 123 and ASTM E 133, borosilicate glass. Dozen **£6. 15. 0.** Each **£0. 12. 3.** *a*

PE-798

FLASK, distillation, 200 ml to IP 195, and ASTM E 133, borosilicate glass. Dozen **£5. 14. 0.** Each **£0. 10. 3.** *m*

DISTILLATION THERMOMETERS—see THERMOMETERS.

Items on this page normally available from stock except those coded *N***.**

DROP POINT OF GREASE, IP 31, BS 894 (Ubbelohde apparatus)

PE-800

THERMOMETER, IP 40C Drop Point Low (TK-569) fitted with sleeve **but without cup.** Each **£3. 19. 0.** *c*

PE-804

THERMOMETER, IP 41C Drop Point High (TK-571) fitted with sleeve **but without cup.** Each **£4. 0. 0.** *c*

PE-810

STANDARD CUP, plated brass.
Dozen **£5. 8. 0.** Each **£0. 10. 0.** *m*

PE-820

HEATING BATH, comprising 400 ml beaker BJ-655, test tube of inside diameter 25 mm and length 110 mm, fitted with cork to take a standard thermometer and with a wire stirrer. **Without thermometers.**
Each **£0. 12. 6.** *b*

REPLACEMENT PART

PE-822	**Test tube, borosilicate glass,** inside diameter 25 mm, length 110 mm.	Dozen **£2. 11. 0.**	Each **£0. 5. 8.**	*a*

DROPPING POINT OF LUBRICATING GREASE, ASTM D566 - IP 132

PE-830

TEST TUBE, borosilicate glass, diameter 12 mm, length 100 mm, with three indentations 19 mm from bottom, fitted with corks bored to take thermometer. **Without thermometer.**
Dozen **£3. 6. 0.** Each **£0. 6. 8.** *a*

PE-832

ROD, stainless steel, length 150—152 mm, diameter 1·2–1·6 mm ... Dozen **£1. 10. 0.** Each **£0. 4. 0.** *b*

PE-834

CUP, plated brass.
Dozen **£5. 8. 0.** Each **£0. 10. 0.** *m*

ACCESSORIES

BJ-625	**Beaker,** borosilicate glass, tall form 400 ml	For full details and prices see entries in List No. sequence.
TK-612	**Thermometer,** IP 62F Partial Immersion	
TK-613	**Thermometer,** IP 62C Partial Immersion	

SOFTENING POINT OF BITUMEN RING AND BALL METHOD IP 58

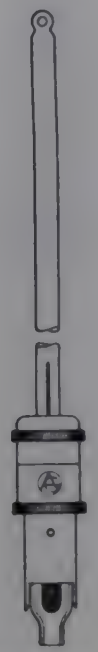
PE-850

RING AND BALL APPARATUS, 2-test, comprising plated brass frame, two standard tapered rings, two ball centering guides and two steel balls. **Without beaker or thermometer** ... ... Each **£5. 0. 0.** *m*

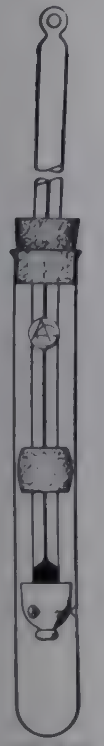
SOFTENING POINT OF ASPHALT (BITUMEN) AND TAR IN ETHYLENE GLYCOL, RING AND BALL ASTM D2398 - IP 198

PE-855

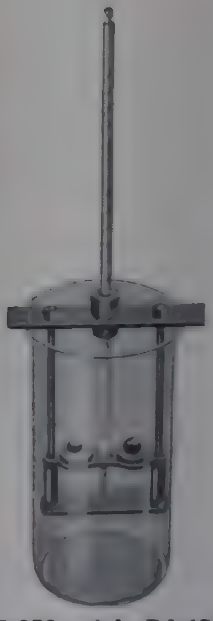
RING AND BALL APPARATUS, 2-test, comprising plated brass frame, two standard shouldered rings, two ball centering guides and two steel balls. **Without beaker or thermometer** ... Each **£5. 0. 0.** *m*



PE-800
with
PE-810



PE-830
PE-834
TK-613



PE-850 with BJ-655 and TK-609

ACCESSORIES AND REPLACEMENT PARTS FOR PE-850 and PE-855

BJ-655	**Beaker,** squat form, 600 ml. For price see entry in List No. sequence.			
PE-862	**Standard ring, tapered,** for PE-850.	Each	**£0. 7. 6.**	*m*
PE-864	**Ball centering guide,** for tapered ring, for PE-850.	Each	**£0. 13. 0.**	*m*
PE-866	**Standard ring, shouldered,** for PE-855.	Each	**£0. 7. 6.**	*m*
PE-868	**Ball centering guide,** for shouldered ring, for PE-855.	Each	**£0. 13. 0.**	*m*
PE-870	**Ball centering guide,** reversible type for tapered and shouldered rings. This pattern avoids the use of two separate guides	Each	**£1. 5. 0.**	*m*
PE-872	**Steel balls,** ⅜ in dia. ...	Pack of 12	**£0. 5. 6.**	*m*
SS-425	**Stirrer**	For prices see entries in List No. sequence.		
SS-455	**Chuck** to hold stirring rotor ...			
SS-546	**Stirring rotor**			
TK-609	**Thermometer,** IP 60C, −2°C to 80°C			
TK-611	**Thermometer,** IP 61C, 30°C to 200°C			
TK-668	**Thermometer,** IP 89C, −1 to 175°C			

All items on this page normally available from stock.

DUCTILITY OF BITUMEN, IP 32

PE-890

PE-890

DUCTILOMETER, 4-test, to IP 32, comprises copper bath with white technolite plate in the base, mounted in a hardwood case. The heater, controlled by a bimetal thermostat, is mounted in a tank below the bath, and a pump circulates water at 25°C ±0·5°C through the bath. Samples are supported 1 cm above the technolite plate and can be elongated to a maximum of 100 cm at a rate of 5 cm/min. For 110/120, 200/210, 220/230 and 240/250V a.c. single phase or d.c. supplies. **Without moulds.** Each **£264. 0. 0.** *f*

PE-892

DUCTILOMETER, 4-test, to IP 32, as PE-890 but modified for use in ambient conditions where cooling is necessary to maintain 25°C in the bath. Fitted with cooling tank with cover. Ice is placed in the tank to cool the bath liquid as it is circulated through a coil in the tank. For 110/120, 200/210, 220/230 and 240/250V a.c. single phase or d.c. supplies. **Without moulds.** Each **£319. 10. 0.** *f*

When ordering please state voltage and nature of supply.

ACCESSORIES

PE-896	**Ductility mould,** brass, to IP 32 ...	Each **£3. 12. 0.**	*fS*
PE-898	**Base plate,** brass, with clamping screw to hold ductility mould while filling	Each **£1. 16. 0.**	*fS*
TK-565	**Thermometer,** IP 38C. For price see entry in List No. sequence.		

ELECTRIC STRENGTH—TRANSFORMER OIL, BS 148, IP 20 and ASTM D877

PORTABLE OIL TEST SET 50,000 V

A portable and compact mains operated instrument for measuring electric strength of switch and transformer oils under test room conditions.

TEST CELL

The apparatus is normally supplied with a test cell in which the electrodes are mounted in the lid so that oil samples may rapidly be changed, thus avoiding the necessity for a number of spare vessels each complete with electrodes. Alternative test cells complying with BS 148, IP 20 and ASTM D877 are also available.

PE-925

POWER UNIT

The set provides smooth, infinitely variable control of output voltage between zero and 50 kV r.m.s. of 0·5 kVA rating with no inherent distortion of waveform. A clearly marked earth terminal is provided, and the user is protected by a safety switch which de-energises the set immediately the perspex hood is raised. The high tension transformer is protected by solid insulation.

DIMENSIONS

H	W	D	Weight
45 ×	38 ×	35 cm	30 kg

PE-925

OIL TEST SET, portable, 50,000V, as specification. With electrode spacing gauge, spare variable transformer contact and spare 3A fuse. For 110/120 or 200/250V 50–60 Hz supplies only ... ... Each **£148. 12. 6.** *m*

When ordering please state voltage and nature of supply.

ACCESSORIES

PE-930	**Extra test vessel,** glass, for test cell supplied.	Each **£1. 0. 0.**	*mS*
PE-932	**Test cell** to BS 148 and IP 20, with electrodes and gauge.	Each **£10. 12. 6.**	*m*
PE-934	**Test cell** to ASTM D 877, with electrodes and gauge.	Each **£10. 12. 6.**	*m*

Items on this page coded *S* **normally available from stock.**

FLASH POINT BY MEANS OF THE ABEL APPARATUS—Petroleum (Consolidation) Act 1928, IP 33 and IP 170

For determining the closed-cup flash point of petroleum products between 0° and 120°F.

PF-030

FLASH POINT APPARATUS, Abel, in accordance with Petroleum (Consolidation) Act 1928. With coal gas test jet, gas burner for heating, stirrer, one each thermometers PF-050 and PF-052, pendulum and suspension hook in hardwood case. Verified by the Board of Trade. Each **£85. 0. 0.** *f*

PF-034

FLASH POINT APPARATUS, Abel, as PF-030 but with coal gas test jet and electric heating element. Verified by the Board of Trade. For a.c. single phase or d.c. supplies.

For 220/240V	Each **£88. 0. 0.** *f*
For 200/210V	Each **£88. 10. 0.** *fN*
For 110/120V	Each **£88. 10. 0.** *fN*

When ordering please state voltage and nature of supply

PF-036

FLASH POINT APPARATUS, Abel, as PF-030 but with oil test jet and heating by spirit lamp. Verified by the Board of Trade ... ... Each **£88. 0. 0.** *f*

REPLACEMENT PARTS

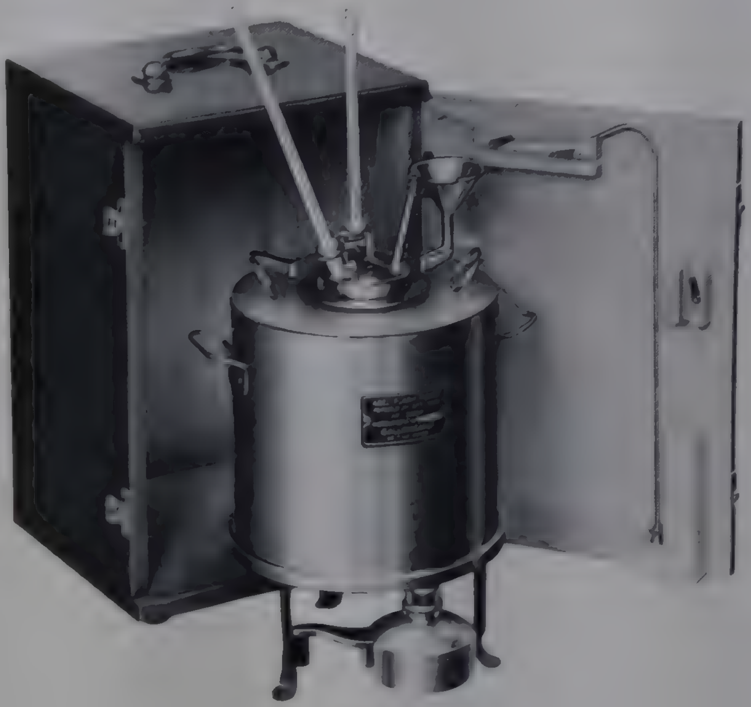
PF-050 **Thermometer,** Abel oil-cup, with collar, scale span 50 to 150°F, subdivided in 1°F, verified by the Board of Trade. (B.O.T. serial number stamped on instrument must be quoted unless thermometer is ordered with new instrument) ... ... Each £4.15. 0. *fN*

PF-052 **Thermometer,** Abel water bath, with collar, scale span 90 to 190°F, subdivided in 1°F, verified by the Board of Trade. (B.O.T. serial number stamped on instrument must be quoted unless thermometer is ordered with new instrument) ... ... Each £4.15. 0. *fN*

ACCESSORIES

TK-540	**Thermometer,** Abel oil-cup, °F ...
TK-541	**Thermometer,** Abel oil-cup, °C ...
TK-636	**Thermometer,** Abel oil-cup, wide range ... ...
TK-542	**Thermometer,** Abel water bath, °F ...
TK-543	**Thermometer,** Abel water bath, °C ...
TK-638	**Thermometer,** Abel water bath, wide range ... ...

For full details and prices see entries in List No. sequence.



PF-036

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for standard packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'dozen' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about 50/0d. per dozen.

This system is intended to encourage ordering in standard packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

Items on this page normally available from stock except those coded *N.*

AUTOFLASH

AUTOMATIC FLASH POINT APPARATUS

For Pensky-Martens flash-point tests up to 700°F and 370°C in accordance with ASTM D 93—IP 34 and NF M 07-019.

(Developed jointly by Gallenkamp and Stanhope-Seta).

PROGRAMMER

- **Digital temperature indicator**
- **Optional °F and °C readout**
- **Precise heating rate**
- **Accurately timed test flame cycle**
- **Controlled steady stirring**
- **Positive flash detection**
- **Rapid heating facility**
- **Built-in alarm**
- **Safety cut-outs**

The apparatus is completely automatic and represents a significant step forward in the field of petroleum products testing, providing greater accuracy, increased reproducibility and a large saving in labour costs, operators being free to conduct other work once the test has been initiated.

TESTER

CONSTRUCTION

The **Tester** comprises a standard Pensky-Martens flash cup resting in an electrically heated block which has a self-emptying water cooling coil controlled by a solenoid valve.

The sample stirrer is driven by a constant speed motor and another similar motor actuates the shutter mechanism. At a signal from the programmer, the stirrer stops dead, one flame dipping cycle is actuated and the stirrer then restarts. The timing of the dipping cycle is very accurate—a feature which is of supreme importance in determining true flash points.

Sample temperature is measured by a platinum resistance thermometer. A differential thermocouple† in the vapour space signals the occurrence of a flash.
(† Designed in co-operation with the late Mr. F. S. Alvey, B.P. Research Centre).

The functions of the **Programmer** include precise control of the heating rate, indicating the sample temperature, initiating the dipping cycles at correct intervals, detecting the flash and finally controlling the application of cooling water.

The platinum resistance thermometer, working in conjunction with a resistance bridge, amplifier, helical potentiometer and null seeking motor, drives a counter to give digital readout of temperature. Check points are provided for testing the temperature indicator at 100°F and 600°F.

The power input to the heater is supplied from a variable auto-transformer which is programmed to give a rough approximation to the specified heating rate. The output from the transformer is then continuously adjusted by a system which compares the actual heating rate as measured by the helical potentiometer with that of a constant speed timing motor.

The apparatus is fitted with an internal 'end of test' audible alarm and provision is made for disconnecting this and using the relay to sound a remote alarm if required.

AUTOFLASH

(continued)

OPERATION

The sample is poured into the cup which is then inserted into the heating bath. After fitting the cover, attaching the stirrer and shutter mechanism drives and adjusting the test flame, the operator selects the temperature at which the test flame is first to be applied, switches to NORMAL or RAPID heating and turns the control knob to 'RUN'. Thereafter the whole test proceeds automatically. Since temperature programme control, dipping cycle and flash detection are strictly in accordance with the standard specifications human error is eliminated and results are accurate and repeatable.

Flexible leads of any desired length may be used to connect the Pensky-Martens tester to the programmer thus permitting tests to be carried out in a fume cupboard without exposing the programmer to contaminating atmospheres.

Operational cycle–°F

With the switch set to NORMAL heating, auto temperature control heats the sample at the specified rate of 10°F per minute in accordance with test specification ASTM D93–IP 34. With the switch set to the RAPID heat position the sample is initially heated at a high rate but the instrument automatically cuts back to the standard rate of heating before the flame dipping cycle commences. At the temperature pre-selected by the operator the stirrer stops, the test flame is applied and, if no flash occurs, the test continues. This cycle is repeated every 2°F below 220°F and every 5°F above 220°F until the flash point is reached. When the flash occurs, a Flash Point lamp lights on the front panel and an alarm sounds inside the instrument, the heater switches off and cooling water circulates to prepare the apparatus for the next test. As a safety precaution the shutter closes. The accurate flash point is left displayed on the digital counter to be read off by the operator.

If the flash has not occurred before the temperature of the sample reaches 50°F above the anticipated flash point or 700°F (whichever is the lower), the test is automatically terminated by means of the Safety Limit Switch, the NO FLASH indicator lamp lights up and the alarm sounds but the FLASH POINT indicator lamp does not light up. (This facility is useful for go/no go testing).

Operational cycle–°C

The cycle of operation of AUTOFLASH when indicating in degrees Centigrade is similar to that described above. The flame is inserted into the cup every 1°C for flash points up to 105°C. Above 105°C the flame is inserted every 3°C for ASTM D93–IP 34 or every 2°C for NF M 07–019.

No-limit runs

The control switch is provided with a NO-LIMIT RUN position in which testing continues beyond temperatures of 50°F above anticipated flash points. This additional facility, although not in accordance with the standard test specification, is useful when testing samples of unknown flash point, e.g. used and contaminated oils.

Mains services

Electricity	220/240V 50 Hz or 110/120V 60 Hz Maximum power rating 550 W
Gas	Town's gas or propane
Water	Cooling water temperature below 70°F (21°C

Dimensions and weights	*Tester*	*Programmer*
Overall dimensions	31 × 37 × 38 cm	33 × 32 × 42 cm
Weight, net	16 kg	24 kg

PF-070

AUTOFLASH, Automatic Pensky-Martens Flash Point Apparatus with **readout in °F.** Comprises tester and programmer with 180 cm interconnecting cable (longer cables can be supplied to order). Includes parts for conversion to NF M 07–019 and to °C readout, special tools, lubricant and full instructions for installing, operating and maintaining. For 220/240V 50 Hz single phase supplies.
Each **£595. 0. 0.** *g*

PF-072

AUTOFLASH, as PF-070, but for 110/120V 60 Hz single phase supplies ... ... Each **£595. 0. 0.** *gN*

(Other voltages and frequencies to special order).

NOTE: Both PF-070 and PF-072 can be supplied ready for operation to NF M 07–019 and with °C readout at no extra charge, if clearly specified on order.

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

PF-076

STAND-BY SPARES KIT, comprising one each flash detecting thermocouple, autotransformer brush, indicator lamp, amplifier valve, thyratron valve, general purpose microswitch, miniature microswitch; two power relays; six each fuses; 30 cm gas tubing, bag of assorted screws, nuts (including snap-on type) and washers.
Kit **£10. 0. 0.** *g*

PF-077

SPARES KIT for 12 months' operation, comprising two kits PF-076 and one each resistance thermometer, probe, plug and socket, multiturn potentiometer, synchronous chopper and counter flexible drive for Programmer, and stirrer flexible drive, motor, heater and relay for Tester. ... ... Kit **£94. 0. 0.** *g*

When ordering Spares Kits, please state whether for PF-070 or PF-072.

PF-080

INSTRUCTIONS MANUAL, additional copies.
Each **£1. 0. 6.** *b*

Items on this page normally available from stock except those coded *N.*

PF-100

PF-110 with PF-124

FLASH POINT (CLOSED) BY MEANS OF THE PENSKY-MARTENS APPARATUS, ASTM D93 - IP 34

For determining the flash point of petroleum products having flash points above 120°F.

PF-100

FLASH POINT APPARATUS, Pensky-Martens, gas heated, with gas test jet. Comprises cast iron air bath with stainless steel top plate, mounted on an upright, which is also a gas manifold feeding a needle valve controlled Meker burner, and the adjustable test and pilot flames. An additional control valve supplies gas for an open flash clip PF-130. There is a ring support for the lid when not in use. The cup lid is clamped in position but easily removable. Supplied complete with gas burner and thermometer collar but **without thermometer.**
Each **£35. 0. 0.** *f*

PF-104

FLASH POINT APPARATUS, Pensky-Martens, as PF-100 but with LPG test jet and heating burner.
Each **£42. 10. 0.** *fN*

PF-110

FLASH POINT APPARATUS, Pensky-Martens, electrically heated, with gas test jet. Comprises cast iron air bath fitted with side and base heaters. A variable transformer mounted in the bottom compartment ensures smooth and easy control of the temperature rise. Provision is made for accelerated cooling by means of an air connection to the interior of the cylindrical stainless steel baffle surrounding the heater units. Total loading 550W. Supplied with one thermometer collar but **without thermometer.**

For 200/250V a.c. supplies ... ... Each **£55. 0. 0.** *f*
For 110/130V a.c. supplies ... ... Each **£55. 0. 0.** *fN*

When ordering please state voltage and nature of supply.

PF-114

FLASH POINT APPARATUS, Pensky-Martens, as PF-110 but with oil test jet.

For 200/250V a.c. supplies ... ... Each **£57. 0. 0.** *fN*
For 110/130V a.c. supplies ... ... Each **£57. 0. 0.** *fN*

When ordering please state voltage and nature of supply.

PF-124

GEARED MOTOR UNIT, complete with flexible drive for attaching to Pensky-Martens flash point apparatus PF-100 et seq. Recommended for routine work where it obviates tedious hand operation.

For 200/250V a.c. supplies ... ... Each **£19. 10. 0.** *f*
For 110/130V a.c. supplies ... ... Each **£19. 10. 0.** *fN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

PF-126	**Thermometer collar**	Each	£0. 6. 0.	*f*
PF-128	**Heating elements** for PF-110 and PF-114.	Pair	£8. 10. 0.	*fN*

ACCESSORIES

TK-522	**Thermometer,** IP 15F Pensky-Martens low	For details and prices see entries in List No. sequence.
TK-523	**Thermometer,** IP 15C Pensky-Martens low	
TK-524	**Thermometer,** IP 16F Pensky-Martens high	
TK-525	**Thermometer,** IP 16C Pensky-Martens high	

FLASH POINT (OPEN) AND FIRE POINT BY MEANS OF THE PENSKY-MARTENS APPARATUS, IP 35

PF-130

CLIP, with gas test jet, for use with flash point apparatus PF-100, PF-104, PF-110 and PF-114... Each **£10. 0. 0.** *f*

Items on this page normally available from stock except those coded *N*.

FLASH POINT (OPEN) AND FIRE POINT BY MEANS OF THE CLEVELAND OPEN CUP, ASTM D92-IP 36

For determining the flash and fire points of all petroleum products except fuel oils and those having an open cup flash below 175°F.

PF-150

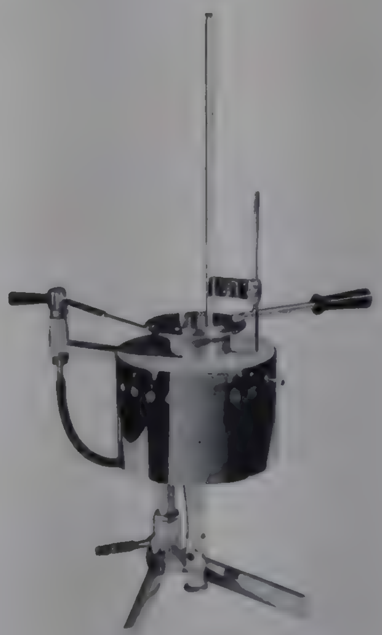
FLASH POINT APPARATUS, Cleveland, gas heated with adjustable gas test jet, brass cup with plastics handle. The assembly with a draught screen for burner is mounted on a combined upright and gas manifold which feeds a Meker burner and the test jet. **Without thermometer** ... ... Each **£27. 10. 0.** *f*

PF-156

FLASH POINT APPARATUS, Cleveland, electric heating and gas test jet. The cup, asbestos board and test flame assembly are mounted on an electric heater controlled by a variable transformer. For 200/250V a.c. single phase supplies. **Without thermometer.** Each **£48. 0. 0.** *f*

ACCESSORIES

TK-544	**Thermometer,** IP 28F Cleveland.	For details and prices see entries in List No. sequence.
TK-545	**Thermometer,** IP 28C Cleveland.	



PF-150

PF-156

FOAMING CHARACTERISTICS OF LUBRICATING OILS, ASTM D892-IP 146

PF-200

GAS DIFFUSER STONE, fitted with tube. Each **£3. 5. 0.** *fS*

PF-202

GRADUATED CYLINDER, *Pyrex* brand glass, 1000 ml ... ... Each **£1. 15. 0.** *mS*

ACCESSORIES

AB-520	**Absorption tower,** 30 × 5 cm ...	For details and prices see entries in List No. sequence.
FL-550	**Flowmeter**	
FL-556	**Flowmeter jet,** No. 4	
GF-052	**Gas meter**	
TB-600	**Tank,** *Pyrex* glass, 30 × 45 cm ...	
TM-860	**Temperature controller** ...	
TK-616	**Thermometer,** IP 64F	
TK-617	**Thermometer,** IP 64C	

LUBRICANT TESTING—ROLL STABILITY ASTM D1831

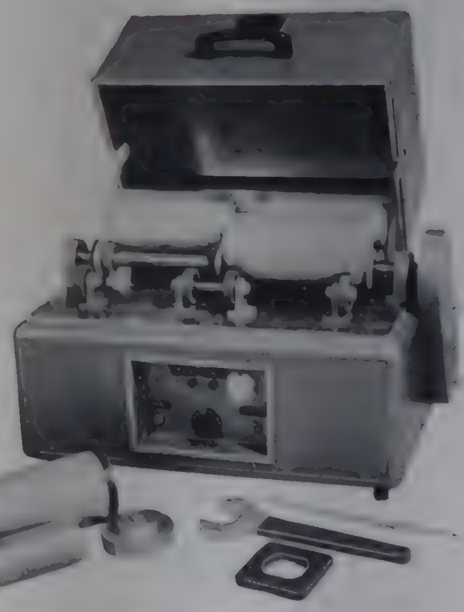
PF-260

ROLL STABILITY TESTER, for 1 to 4 cylinder assemblies each containing a weighted roller. The cylinders are housed in a hot air oven with hinged lid and rotated at either 10 or 165 rev/min. **Requires but does not include** roller weights PF-262 and cylinder PF-264. For 110/130 or 200/250V 50 or 60 Hz single phase supplies. Each **£245. 0. 0.** *f*

When ordering please state voltage and nature of supply also number of roller weights PF-262 and cylinders PF-264 required.

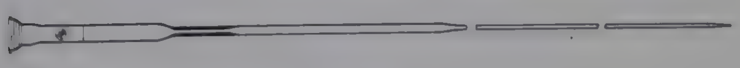
ACCESSORIES

PF-262	**Roller weight**	Each £6. 0. 0. *f*
PF-264	**Cylinder**	Each £20. 0. 0. *f*
PF-731	**Cone,** quarter scale	For details and prices see entries in List No. sequence.
PF-770	**Greaseworker,** quarter scale ...	

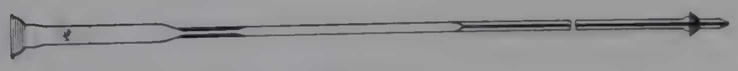


PF-260

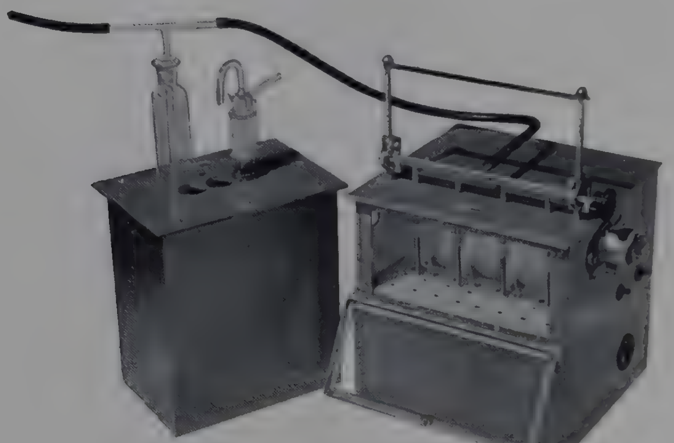
Items on this page coded *S* normally available from stock.



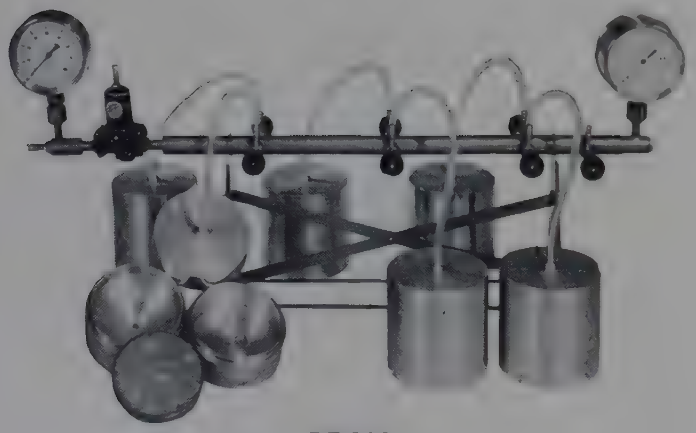
PF-310



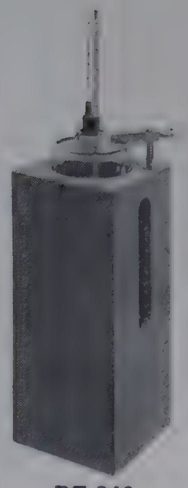
PF-312



PF-340 with PF-342



PF-355



PF-360

HYDROCARBON TYPES IN LIQUID PETROLEUM PRODUCTS BY FLUORESCENT ADSORPTION ASTM D1319-IP 156

PF-310

COLUMN, adsorption, standard wall glass tubing, with spherical cup 28/12 and vinyl tubing connecting separator and analyser sections ... Each **£5. 4. 0.** *aS*

PF-312

COLUMN, adsorption, precision bore glass tubing, with spherical cup 28/12 and spherical joint 12/2 in analyser section ... ... Each **£7. 5. 0.** *aS*

LOSS ON HEATING IP 45, ASTM D6

see Basin PF-684 in List No. sequence

OIL CONTENT OF PETROLEUM WAXES ASTM D721-IP 158

PF-340

OIL CONTENT APPARATUS, comprising bath for three filter stick assemblies, thermostatically controlled evaporation cabinet for four 15 ml weighing bottles and air manifold. Provision is made for mounting the air regulator behind the bath. For 200/250V a.c. supplies. **Without glassware** ... ... Each **£120. 0. 0.** *f*

PF-342

GLASSWARE, for PF-340 comprising air regulator, filter stick, cooling coil and four 15 ml weighing bottles. Set **£6. 10. 0.** *f*

OIL SEPARATION ON STORAGE OF GREASE IP 121

PF-350

SEPARATION APPARATUS, comprising stainless steel separation cup, gauze cone, 100 gm stainless steel weight and oil cup ... ... Each **£10. 0. 0.** *fS*

OIL SEPARATION FROM LUBRICATING GREASE DURING STORAGE ASTM D1742

PF-355

SEPARATION APPARATUS, comprising six grease test cells type B, air pressure rack with manifold, control valves, air regulator and pressure gauge. Each **£238. 0. 0.** *f*

FREEZING POINT OF AVIATION FUELS ASTM D2386-IP 16

PF-360

FREEZING POINT APPARATUS, comprising unsilvered vacuum flask in protective case and a clear jacketed sample tube with cork stopper, brass packing gland and stirrer. **Without thermometer.** Each **£15. 0. 0.** *fS*

REPLACEMENT PARTS

PF-362	**Jacketed sample tube**	Each	**£3. 10. 0.**	*f*
PF-364	**Vacuum flask,** unsilvered	Each	**£3. 10. 0.**	*f*
PF-366	**Packing gland,** brass	Each	**£2. 10. 0.**	*f*
TK-521	**Thermometer,** IP 14C. For details and prices see entry in List No. sequence.			

Items on this page coded *S* **normally available from stock.**

MELTING POINT OF WAX (COOLING CURVE) ASTM D87-IP 55

PF-380

MELTING POINT APPARATUS, comprising test tube PF-382 fitted in air bath and water bath assembly. **Without thermometers** ... ... Each **£10.10. 0.** *f*S

REPLACEMENT PART

PF-382	**Test tube,** graduated ...	Pack of 10	**£2.15. 0.**	*f*S

ACCESSORIES

TK-526	**Thermometer,** IP 17F	For details and prices see entries in List No. sequence.
TK-527	**Thermometer,** IP 17C	

DROP MELTING POINT OF PETROLEUM WAX including PETROLATUM, ASTM D127-IP 133

TF-180	**Test tube,** borosilicate glass, diameter 25 mm, length 150 mm	For full details and prices see entries in List No. sequence.
BJ-655	**Beaker,** borosilicate glass, 2000 ml ...	
TK-615	**Thermometer,** IP 63C Petrolatum ...	

OXIDATION STABILITY OF AVIATION FUELS (POTENTIAL RESIDUE METHOD) ASTM D873-IP 138

OXIDATION STABILITY OF GASOLINE (Induction Period Method), ASTM D525-IP 40

PF-400

OXIDATION STABILITY BOMB, 18/8 chromium nickel alloy steel, except sealing ring which is plated gunmetal, and neoprene gasket. The feeding tube has a metal supporting disk and is fitted with a needle valve.
Each **£50. 0. 0.** *f*

REPLACEMENT PART

PF-402	**Gasket,** neoprene, for bomb PF-400.	Dozen	**£1. 9. 0.**	*f*S

ACCESSORIES

PF-404	**Flexible tube,** 5 ft long, with couplings at each end for connecting bomb to recorder ...	Each	**£2. 7. 6.**	*f*
PF-406	**Wrench,** for tightening closure ring.	Each	**£3.18. 9.**	*f*
PF-408	**Bench socket,** for body of bomb ...	Each	**£2.17. 9.**	*f*
PF-410	**Glass liner,** with cover, borosilicate glass. Dozen £9.19. 6.	Each	**£0.18. 6.**	*f*

PF-414

OXYGEN CHARGING OUTFIT, comprising pressure regulator with two gauges for attaching to oxygen cylinder and 6 ft flexible pressure hose with air duct for fitting to bombs ... ... Each **£17. 1. 3.** *f*

PF-420

PRESSURE RECORDER, *Cambridge*, electrically driven, two pen type with 10 in diameter charts No. 228, range 80 to 200 lb/in² in 2 lb divisions, complete with 100 charts and two different coloured inks. For 110/120, 200/220 or 230/250V 50 Hz single phase supplies.
Each **£35. 5. 0.** *f*

When ordering please state voltage and nature of supply.

PF-430

WATER BATH, for two bombs, electrically heated, constructed of heavy gauge tinned brass. Inside dimensions 35 × 30 × 41 cm deep, with stainless steel top plate, well lagged and provided with 2·5 cm overhang for flush mounting in bench top. Fitted with 3-heat switch, maximum load 2 kW. Complete with condensers with lids but without bombs. For 110/120 or 230/250V a.c. single phase supplies ... ... Each **£98. 3. 6.** *f*

When ordering please state voltage and nature of supply.

PF-400

PF-430

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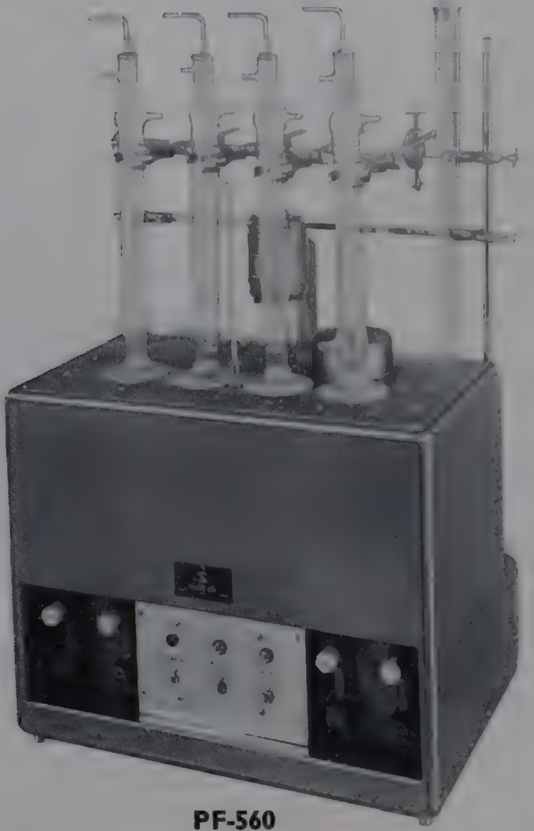


PF-560
with glassware

OXIDATION TEST FOR TRANSFORMER OIL BS 148, IP 56 and ASTM D1314

OXIDATION TEST FOR TURBINE OIL, IP 114

PF-560

OXIDATION TEST OIL BATH, 4-test. Accommodates four oxidation flasks. The air supply is through a manifold and four flowmeters mounted on the front panel. Needle valves control the excess air bled off at the rear mounted pressure regulators, air flow being regulated by a glass capillary tube in the line from the flowmeters to the inlet tubes. Loading 2 kW. For 100/130, 200/220 and 230/250V 50 Hz single phase supplies. **Without thermometer or glassware.**
Each **£240. 0. 0.** *f*

When ordering please state voltage and nature of supply.

PF-570

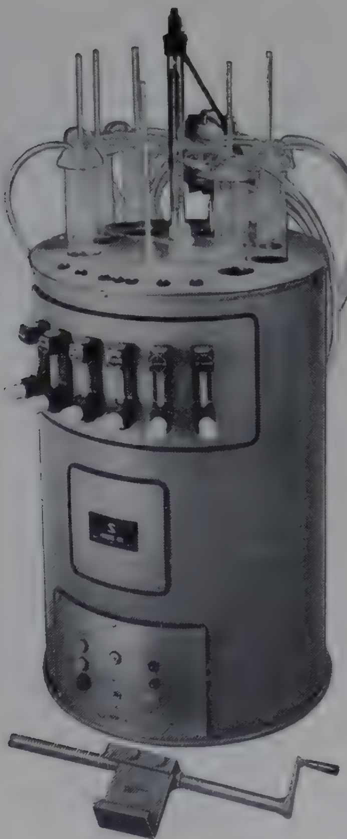
GLASSWARE, for PF-560 comprising four each flasks, condenser air inlet tubes, pressure regulator tubes, and air bleed tubes ... ... Set **£3. 6. 0.** *aS*

PF-580

PURIFYING AND DRYING TRAIN, comprising two 1 litre Woulff bottles, one 2 litre Woulff bottle, drying tower, connecting tubes, safety bulbs and rubber stoppers ... ... Each **£11.10. 0.** *cS*

ACCESSORIES

GR-100	**Glass balls,** 3 mm ...	For details and prices see entries in List No. sequence.
TK-563	**Thermometer,** IP 37C	



PF-600 with glassware

OXIDATION CHARACTERISTICS OF INHIBITED STEAM TURBINE OILS, ASTM D943-IP 157

PF-600

OIL BATH, thermostatically controlled, for six oxidation cells, with drain tube and stirrer. Oxygen flow to each cell is indicated by individual flowmeters. A manifold distributes water to the cooling condensers. Heating is by an immersion element controlled by an electronic relay and an adjustable contact thermometer set to regulate at 95 ±0·2°C. For use on 100/130, 200/220 or 230/250V 50 or 60 Hz single phase supplies ... Each **£260. 0. 0.** *f*

When ordering please state voltage and nature of supply.

PF-602

GLASSWARE, for PF-600, comprising six each condensers, test tubes and delivery tubes.
Set **£30. 0. 0.** *f*

ACCESSORIES

PF-604	**Catalyst wire,** steel, in 3 metre lengths.	Pack of 6 **£3. 0. 0.**	*fS*
PF-606	**Catalyst wire,** copper, in 3 metre lengths.	Pack of 6 **£3. 0. 0.**	*fS*
PF-608	**Wire coiling mandrel**	Each **£45. 0. 0.**	*f*

Items on this page coded S normally available from stock.

PENETRATION OF BITUMEN, IP 49 and ASTM D5.

PENETRATION OF GREASES AND PETROLATUM, IP 50 and ASTM D217.

CONE PENETRATION OF PETROLATUM, ASTM D937-IP 179.

PENETRATION OF SEMI-FLUID GREASES IP 167.

PRECISION PENETROMETERS

A base, with adjustable feet and a spirit level, supports a sample table and the penetrometer mechanism. The elevation of the table can be adjusted precisely and locked. The needle holder, complete with needle, weighs approximately 48 g and has a hollow chamber to hold lead shot for accurate adjustment of the weight to 50 g. Additional weights of 50 g and 100 g are supplied for fitting to the needle holder. The needle holder guide offers minimal frictional resistance to fall of the needle holder and is vibration free.

The movement of the holder is indicated by a 15 cm diameter dial gauge calibrated 0 to 360, each division representing 0·1 mm of movement or unit penetration. The pointer is adjustable independently of the movement, which is smooth and free from backlash.

On the manual model, the holder is released by pressing a button and locked by removing the pressure. The automatic model is fitted, in addition, with a very sensitive electro-magnetic release-and-stop solenoid controlled by an accurate mains operated timer in the base of the instrument. The timer releases the needle-holder for 5 seconds, and is accurate to ±1% independently of normal mains variations.

PF-670

PENETROMETER, PRECISION MODEL, with automatic release-and-stop mechanism, as specification, complete with 50 g and 100 g weights and tapped transformer for 100/120V and 200/250V a.c. single phase supplies. **Without standard needle or cone.**

Each **£75. 0. 0.** *m*

PF-672

PENETROMETER, PRECISION MODEL, with manual control, as specification, complete with 50 g and 100 g weights. **Without standard needle or cone.**

Each **£43. 0. 0.** *m*

STANDARD PENETROMETER

The base has adjustable feet, a spirit level, but no provision for raising and lowering the table. Coarse vertical adjustment of the needle position is made by moving the penetrometer mechanism support bracket and fine adjustment by moving the needle holder. The needle holder, release mechanism and dial gauge are similar to those fitted to the precision model.

PF-675

PENETROMETER, STANDARD MODEL, complete with 50 and 100 g weights. **Without standard needle or cone** ... ... Each **£31. 7. 6.** *m*

- HIGH ACCURACY AND SENSITIVITY
- SIMPLE AND CONVENIENT TO OPERATE
- AUTOMATIC OR MANUAL OPERATION
- FULLY ENCLOSED CONTROLS

PF-670 with PF-680

PF-672 with PF-680

All items on this page normally available from stock.

PENETROMETER ACCESSORIES

GENERAL ACCESSORIES

PF-680 **Adjustable mirror** ... ... Each **£1.16. 6.** *m*

PF-684 **Sample container,** aluminium, $2\frac{3}{16}$ in dia. × $1\frac{3}{8}$ in deep.
Dozen **£1. 7. 0.** Each **£0. 3. 9.** c

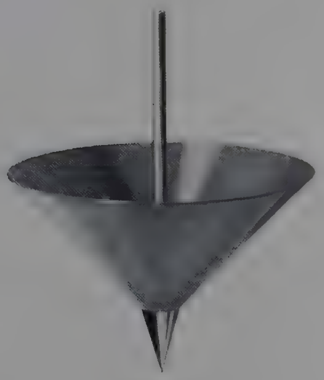
PF-685 **Sample container,** aluminium, $2\frac{3}{16}$ in dia. × $2\frac{1}{4}$ in deep for materials with a penetration over 225.
Dozen **£1.13. 0.** Each **£0. 4. 3.** c

PF-686 **Sample container,** copper, extra rigid with dished bottom, $2\frac{3}{16}$ in dia. × $1\frac{3}{8}$ in deep.
Dozen **£1.15. 0.** Each **£0. 4. 5.** c

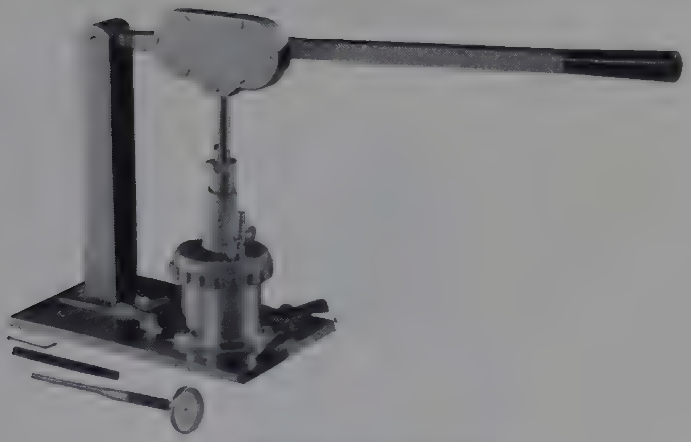
PF-687 **Sample container,** as PF-686 but, $2\frac{3}{16}$ in dia. × $2\frac{1}{4}$ in deep for materials with a penetration over 225.
Dozen **£2. 6. 0.** Each **£0. 5. 2.** c

PF-688 **Transfer dish,** made of heavy gauge chromium-plated copper with reinforced platform giving very rigid support for sample container, 4 in dia. × 3 in deep.
Each **£3. 0. 0.** c

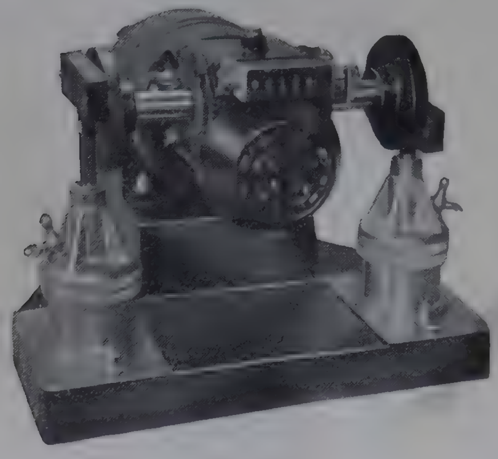
TK-565 **Thermometer,** IP 38C. For details and price see entry in List No. sequence.



PF-700
PF-710
PF-720



PF-740 with PF-744



PF-760

PENETRATION CONES AND NEEDLES

PF-690
PENETRATION NEEDLE, to IP 49.
Each **£0.17. 6.** *m*

PF-691
PENETRATION NEEDLE, to IP 49 as PF-690 but with NPL certificate ... ... Each **£2.17. 6.** *mN*

PF-694
PENETRATION NEEDLE, to ASTM D5.
Each **£0.17. 6.** *m*

PF-695
PENETRATION NEEDLE, to ASTM D5 as PF-694 but with NPL certificate... ... ... Each **£2.17. 6.** *mN*

PF-700
PENETRATION CONE, to IP 50, for penetration of grease to a limiting value of 400 and petrolatum to ASTM D937-IP 179 ... ... Each **£7. 0. 0.** *m*
PF-702 **Tip,** hardened steel ... ... Each **£1. 6. 3.** *m*

PF-710
PENETRATION CONE, to IP 167, for penetration of semi-fluid greases having penetrations greater than 350 ... ... Each **£7. 0. 0.** *m*
PF-712 **Tip,** hardened steel ... ... Each **£2. 9. 6.** *m*

PF-720
PENETRATION CONE, to ASTM D217 for penetration of lubricating grease, and ASTM D937-IP 179 for penetration of petrolatum ... ... Each **£7. 3. 0.** *m*
PF 722 **Tip,** hardened steel ... ... Each **£1. 6. 3.** *m*

PF-728
PENETRATION NEEDLE FOR WAXES, to ASTM D1321 ... ... Each **£3.14. 3.** *mN*

PF-731
PENETRATION CONE, quarter scale, to ASTM D1403, for penetration of lubricating grease.
Each **£12. 0. 0.** *m*

GREASEWORKERS

PF-740
GREASEWORKER, to IP 50, with central operating rod and watertight cover fitted with air release cock.
Each **£22. 0. 0.** *fN*

PF-744
GREASEWORKER, SLAVE, for use with greaseworker PF-740. Greatly facilitates the working of heavy greases at up to 60 double strokes per minute.
Each **£35. 0. 0.** *fN*

ACCESSORIES
PF-746 **Extra cup,** for PF-740 ... ... Each **£8.10. 0.** *fN*
PF-748 **Blank cover,** for PF-740, with tommy bar.
Each **£3.15. 0.** *fN*

PF-760
GREASEWORKER, MECHANICAL, electrically driven, with two greaseworkers to IP 50. The machine is driven by a motor through a reduction gear to give a speed of 60 strokes per minute. The motor has overload protection and a no-volt trip starter. A five figure counter indicates the number of strokes. Two water-tight covers are provided so that the samples can be immersed in a water bath. For 100/110, 200/220 or 230/250V 50 Hz single phase supplies ... ... Each **£173. 5. 0.** *fN*

When ordering please state voltage and nature of supply.

PF-770
GREASEWORKER, quarter scale, to ASTM D1403, with cover fitted with air release cock, for use with 5 g of sample. Complete with bench clamp.
Each **£12. 0. 0.** *m*

ACCESSORIES
PF-772 **Greaseworker cover** ... ... Each **£0.13. 9.** *m*
PF-774 **Sample cup** ... ... Each **£0.14. 0.**

Items on this page normally available from stock except those coded *N*.

EXISTENT GUM IN FUELS BY JET EVAPORATION, ASTM D381-IP 131

SPECIFICATION

Comprises a well-lagged aluminium heating block in a stove enamelled cylindrical outer case. A stainless steel pre-heating coil and manifold are cast into the block in which the five wells are subsequently bored. The block is electrically heated by two elements rated at 850 and 1400W respectively. The 850W block heater operates in conjunction with the thermostat and is used on its own for the air jet method. The 1400W steam boost heater is used for the steam jet method and is left on continuously with the block heater for this method. The heaters and preheating coils are so arranged as to render the use of an external heater unnecessary. A dial type flowmeter is fitted to the air inlet.

DIMENSIONS AND SUPPLY REQUIREMENTS

Size of casing, not including projecting parts, diameter 38 cm, height 38 cm. Weight 32 kg.

Air supply 10 ft^3/min at 5 lb/in^2 (5 l/sec at 300 g/cm^2 approximately). Dry steam supply required as for air but at 20 lb/in^2 (1·2 kg/cm^2).

Total loading 2250W. Voltage 100/120 or 230/250V a.c. single phase.

PF-800

RESIDUE ON EVAPORATION APPARATUS, 5-test, as specification, complete with 5 conical outlet adapters and 5 beakers ... ... Each **£232. 0. 0.** *fN*

When ordering please state voltage and nature of supply.

PF-810	**Beaker, borosilicate glass, height 75 mm high, outside diameter 51 mm ... ...**	**Pack of 10**	**£2. 10. 0.**	**c**

NEUTRAL OIL STPTC, PC4 and GB 5

PF-880

RECEIVER, separating funnel, STPTC, *Technico,* **Class A.**

Schedule No.	V4B	V4C	
Stem capacity	3	1 cm^3	
Each	**57/6**	**57/6**	*a*

SAPONIFIABLE AND UNSAPONIFIABLE MATTER, OILS, FATS and WAXES, IP 136

see Flask Q-FR 250/3S and Condenser Q-CX 2/23 under QUICKFIT APPARATUS

SEDIMENT IN CRUDE AND FUEL OILS BY EXTRACTION, ASTM D473-IP 53

PF-960

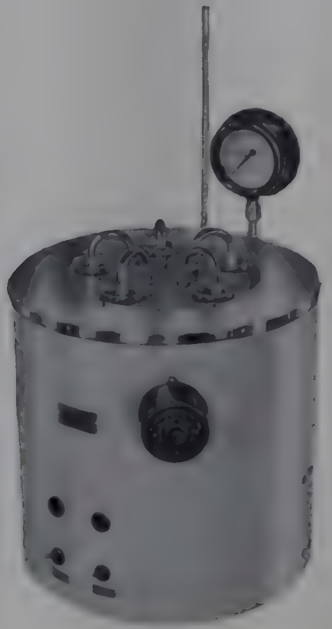
CONDENSER, block-tin ... ... Each **£3. 10. 0.** *m*

PF-962

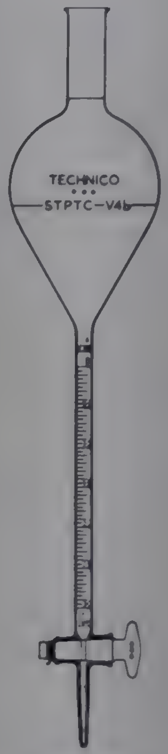
THIMBLE, fused alumina, height 7 cm, diameter 2·5 cm, weighing between 15 and 17 g.
Pack of 10 **£4. 1. 0.** Each **£0. 9. 0.** *m*

ACCESSORIES

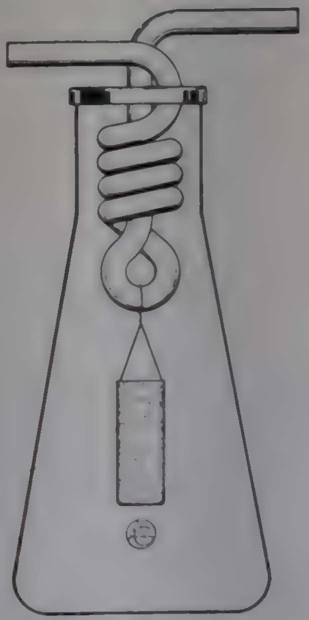
PF-964	**Thimble basket ... ...**	**Each £5. 0. 0.**	*f*
PF-965	**Water cup ... ...**	**Each £0. 15. 0.**	*a*
FJ-070	**Flask, conical, wide mouth, capacity 1 litre ... ...**	**For details and prices see entries in List No. sequence.**	
PR-680	**Wire, platinum, 0·015 in diameter (5 in length required) ... ...**		



PF-800



PF-880



Extraction assembly with PF-960 &c.

SPECIFIC GRAVITY AND DENSITY, IP 59, ASTM D1298 and IP 160, ASTM D941 and IP 189, ASTM D70 and IP 190, STPTC V12, V13

DJ-534	**Density bottle, with capillary stopper.**	For details and prices see entries in List No. sequence.
DJ-550	**Density bottle, with capillary stopper** and ground-on cap	
DJ-560	**Density bottle,** Hubbard, to STPTC Schedule V12	
DJ-780	**Pyknometer tube,** Sprengel, to STPTC Schedule V13	
DJ-790	**Pyknometer tube,** Lipkin, to IP 189	
HT-150	**Hydrometers,** to ASTM D1298, IP 160 and BS 718 Series L50SP ...	
HT-160	**Hydrometers,** to ASTM D1298, IP 160 and BS 718 Series M50SP ...	

SPECIFIC REFRACTIVITY, IP 60

see REFRACTOMETERS

Items on this page normally available from stock except those coded *N.*

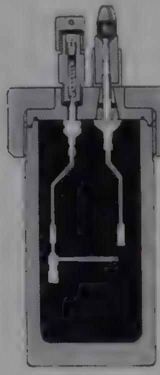
SULPHUR IN PETROLEUM PRODUCTS by the Bomb Method, ASTM D129—IP 61,

requires the following components all of which are in accordance with the specification.

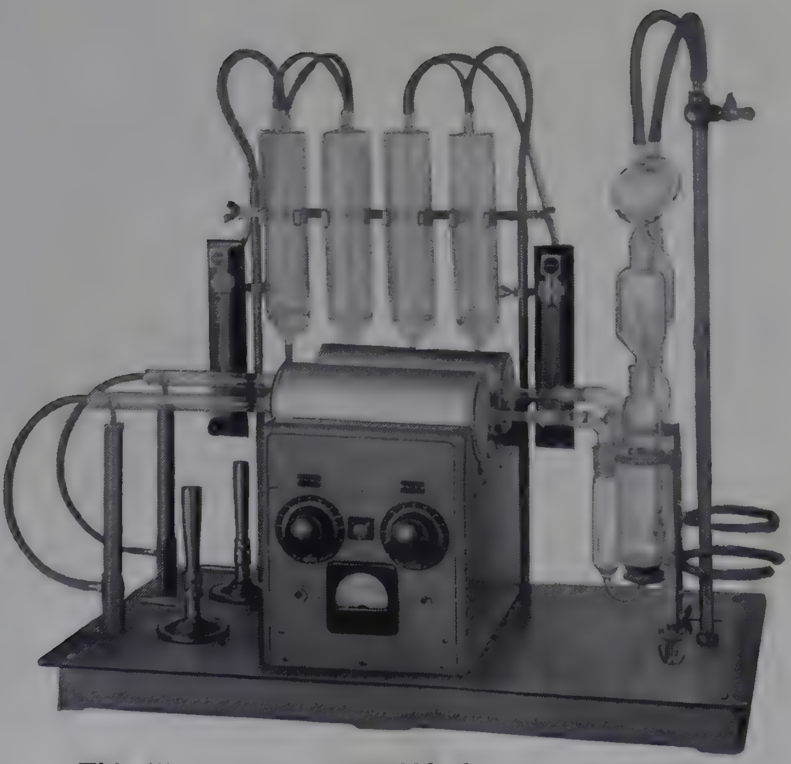
CB-200	**Bomb,** *Gallenkamp*, with certificate of test	For details and prices see entries in List No. sequence.	
CB-215	**Stand,** for bomb cap		
CB-220	**Pressure gauge**		
CB-225	**Bomb filling tube**		
CB-230	**Connecting tube**		
CB-234	**Spanner**		
CB-235	**Needle valve**		
PH-170	**Crucible, platinum,** 27 mm dia. × 12 mm deep with flange, weight approx. 11 g.	Price on application	
PH-175	**Transformer,** for firing bombs from a.c. mains, with output rated at 8V, 64VA for 10 sec duration. Totally enclosed in steel case, with a biased 'off' switch in the primary and an earthed secondary winding with a fuse and ammeter. For 200/250V 50 Hz single phase supplies only	Each £14. 10. 0.	*cS*
PH-180	**Ignition wire,** platinum 27 swg, 100 mm long.	Each £0. 18. 0.	*mS*
PH-182	**Adapters,** to clamp ignition wire PH-180 to bomb electrodes	Pair £1. 4. 6.	*bS*

PH-190

BATH, stainless steel, to hold bomb CB-200, during firing ... ... Each **£12. 0. 0.** *bS*



CB-200



This illustration of PH-230 shows it fitted with type I glassware PH-245

SULPHUR CONTENT—Quartz Tube Method, IP 63

PH-230

COMBUSTION UNIT, 2-test, electrically heated. The dual furnace unit consists of a sheet metal casing, pyrometer and changeover switch, energy regulator for each furnace, and control switches. The furnaces operate at 24V supplied from stepdown transformers. A platinum/rhodium thermocouple is fitted to each furnace. Oxygen, air and vacuum lines are built into the base. There are adjustable supports to receive both types of absorption vessels. For 110/130V or 200/250V a.c. single phase supplies only. **Without glassware.**

Each **£210. 0. 0.** *f*

When ordering please state voltage and nature of supply.

PH-245

DOUBLE SET OF IP TYPE I GLASSWARE, for PH-230, comprising two each silica combustion tubes, adapters, 90° elbows, absorbers, splash heads and four scrubbers ... ... Set **£65. 0. 0.** *f*

REPLACEMENT PARTS

PH-250	**Combustion tube,** transparent silica, 540 mm long, with 19/17 socket and 14/23 cone, and section packed with quartz particles	Each £10. 10. 0.	*f*
PH-252	**Adapter,** borosilicate glass, with 19/17 cone and nozzle for connecting to purifying train ...	Each £0. 18. 0.	*f*
PH-254	**Elbow,** borosilicate glass, 90° angle, with 14/23 socket and 24/29 cone	Each £1. 5. 0.	*f*
PH-256	**Absorption vessel, lower part,** borosilicate glass, with 24/29 cone and socket and No. 1 porosity fritted plate.	Each £4. 5. 0.	*f*
PH-258	**Absorption vessel,** upper part, borosilicate glass, with 24/29 cone and socket and No. 3 porosity fritted plate.	Each £3. 5. 0.	*f*
PH-260	**Splash head,** borosilicate glass, with 24/29 cone.	Each £1. 15. 3.	*f*

For **FLOWMETERS** see FL-422, range 1·5–5·0 litres/min, in List No. sequence.

SULPHUR CONTENT—High Temperature Combustion Method

The determination of the sulphur content of oils, greases, bitumens and similar substances can be carried out at 1350°C using a *Gallenkamp* High Temperature Tube Furnace FS-300. Full details see entry in List No. sequence.

Combustion tubes, components for purifying and absorption trains and titration apparatus see Index.

Items on this page coded S normally available from stock.

SULPHUR IN PETROLEUM PRODUCTS AND LIQUEFIED PETROLEUM (LP) GASES, Lamp Method, ASTM D1266—IP 107

PH-290

ASSEMBLY, 11-test unit, comprising tubular framework which acts as two manifolds for supplying natural or synthetic air for suction purposes, and needle valves for each circuit. The absorbers are supported in wooden blocks on a stainless steel platform, and all glassware is readily accessible. Two scrubbers for incoming air and three manometer type pressure regulators are supported at the rear. **Without glassware.** Each **£180. 0. 0.** *f*

PH-294

GLASSWARE, complete set for 11-test unit, comprising eleven each of flasks, standard burners, chimneys, absorbers, splash bulbs, and three pressure regulators, two scrubbers and two levelling bulbs. Set **£135. 0. 0.** *f*

PH-296

ASSEMBLY, 5-test unit as PH-290. **Without glassware** ... ... Each **£130. 0. 0.** *f*

PH-298

GLASSWARE, complete set for 5-test unit, comprising five each of flasks, standard burners for kerosene, gasoline and similar liquids, chimneys, absorbers, splash bulbs, and three pressure regulators, two scrubbers and two levelling bulbs ... ... Set **£80. 0. 0.** *f*

REPLACEMENT PARTS FOR PH-294 and PH-298

PH-300	**Burner, standard**	Each	**£1. 10. 0.**	*f*
PH-302	**Chimney**	Each	**£3. 0. 0.**	*f*
PH-303	**Absorber**	Each	**£4. 5. 0.**	*f*
PH-304	**Splash bulb**	Each	**£1. 10. 0.**	*f*
PH-306	**Pressure regulator**	Each	**£4. 5. 0.**	*f*
PH-308	**Scrubber**	Each	**£11. 0. 0.**	*f*

ACCESSORIES

PH-316	**Flask,** for aromatic samples ...	Each	**£1. 5. 0.**	*f*
PH-318	**Burner,** for aromatic samples ...	Each	**£1. 10. 0.**	*f*
PH-320	**Burner,** for LPG samples	Each	**£1. 15. 0.**	*f*
PH-325	**Sampling bomb,** 100 ml, single valve model, for LPG samples	Each	**£20. 0. 0.**	*f*
PH-326	**Auxiliary regulating valve** for LPG samples, with tubing.	Each	**£10. 0. 0.**	*f*

PH-328

SYNTHETIC AIR UNIT, for supplying a mixture of carbon dioxide and oxygen to the lamp sulphur apparatus. A combustion-supporting mixture of 70% CO_2 and 30% O_2 is delivered by this unit. Gases are supplied from commercial cylinders, the pressure being controlled by two single stage regulating valves. Built-in flowmeters with an illuminated panel are provided and a thermostatically controlled heater automatically governs the temperature of the CO_2 to prevent freezing. For 110/130 and 200/250V a.c. single phase supplies. Each **£195. 0. 0.** *f*

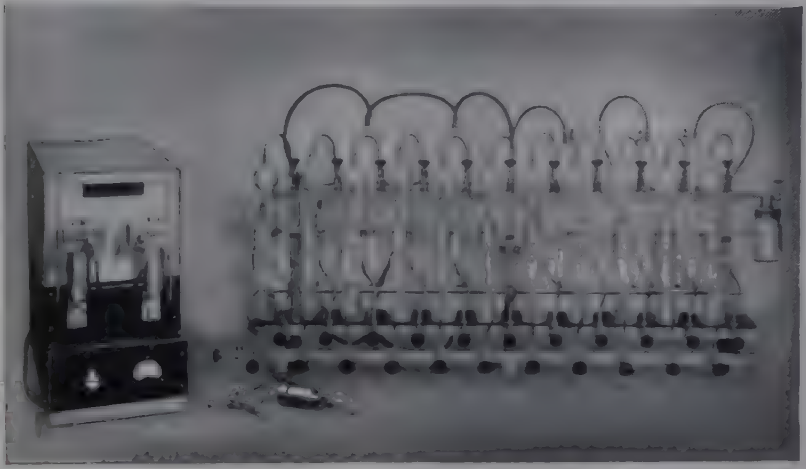
When ordering please state voltage and nature of supply.

NOTE: In locations where CO_2 and O_2 cylinders are not readily available, purified air can be prepared by the following apparatus and used instead.

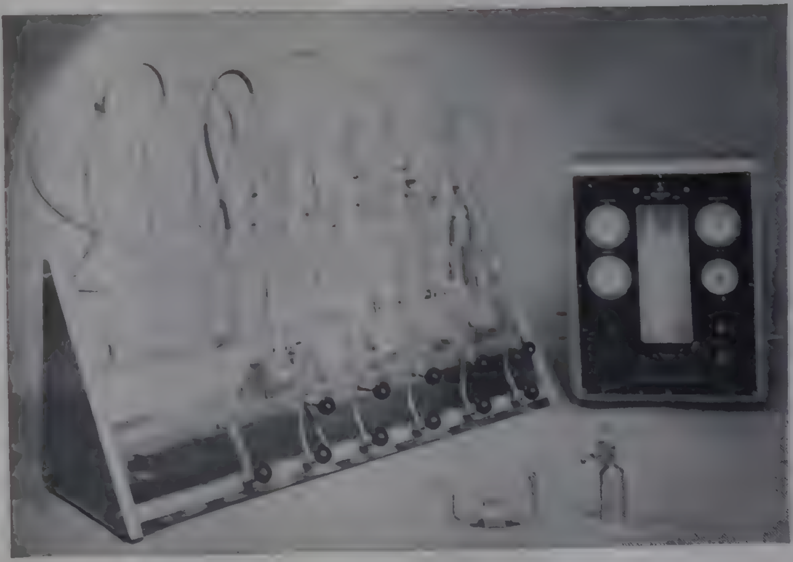
PH-330

PURIFIED AIR FURNACE, for supplying pure air to lamp sulphur apparatus. Comprises a U-shaped nickel chromium tube heated to 1,000°C and a low voltage transformer. All terminals are water cooled and the pure air is cooled and filtered before passing to the sulphur apparatus. Load 2·5 kVA. For 110/130 and 200/250V a.c. single phase supplies ... ... Each **£400. 0. 0.** *f*

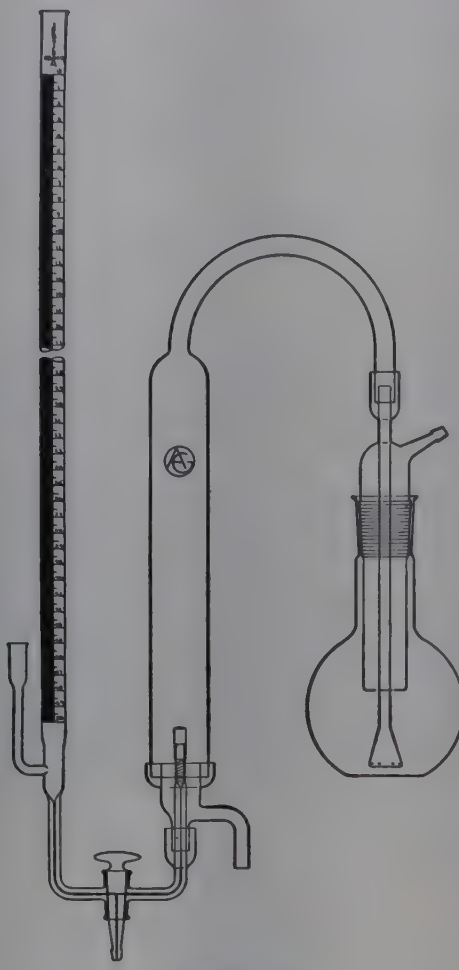
When ordering please state voltage and nature of supply.



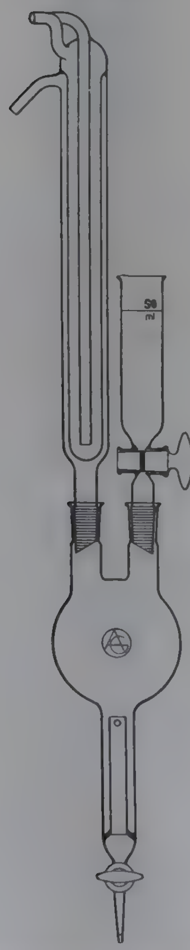
PH-290 with PH-294, PH-325, PH-326, PH-330



PH-296 with PH-298, PH-325, PH-326, PH-328



PH-340



PH-400 to PH-406
(Heater winding
not illustrated)

TOTAL SULPHUR IN REFINED LOWER BOILING PRODUCTS, STPTC LB15, BS 135 and BS 805

PH-340

SULPHUR TEST APPARATUS, comprising components listed below, on tripod base stand, with clamps and adjustable support for wash flask. Each **£18. 10. 0.** *a*

PH-342 **Burner,** with 3-way stopcock and 50 cm³ burette, *Technico*, Class A, subdivided in 0·1 cm³. Each **£3. 18. 0.** *a*

PH-344 **Burner sleeve, translucent silica.** Pack of 10 **£0. 12. 6.** *m*

PH-346 **Air inlet and mercury seal, borosilicate glass,** with side arm ... ... Each **£1. 2. 0.** *a*

PH-348 **Chimney, borosilicate glass** ... Each **£0. 15. 0.** *a*

PH-350 **Inlet tube and scrubber, borosilicate glass,** with 34/35 cone, packed with graded broken glass, passing 5 mm mesh and retained on 3 mm mesh. Each **£2. 3. 0.**

PH-352 **Wash flask, borosilicate glass,** 500 ml, 34/35 socket. Each **£0. 18. 0.** *a*

AB-530 **Drying tower,** 25 cm high, 5 cm diameter, with tubulure and ground-in stopcock (two supplied). For price see entry in List No. sequence.

TETRAETHYL LEAD IN GASOLINE—Chlorate Oxidation Method, IP 116

PH-390

EXTRACTION APPARATUS, borosilicate glass, comprising reaction flask with stopcock, glass stirrer paddle, and side arms for graduated dropping funnel and spiral condenser ... ... Each **£12. 15. 0.** *a*

ACIDITY (INORGANIC) OF PETROLEUM PRODUCTS — Colour Indicator Titration Method, IP 182

LEAD IN GASOLINE—Gravimetric Method, ASTM D526, IP 96

PH-400

FLASK, Ⓐ, 2-neck, borosilicate glass, 500 ml with two 19/26 sockets, heating tube, stopcock. Complete with 250W heater winding for 230/250V supplies terminating in a connector block ... ... Each **£5. 15. 0.** *b*

PH-404

REFLUX CONDENSER, Ⓐ, borosilicate glass, length 300 mm, with 19/26 cone ... Each **£1. 19. 0.** *a*

PH-406

TAP FUNNEL, Ⓐ, with mark at 50 cm³ and 19/26 cone ... ... Each **£1. 7. 6.** *a*

ED-322 **Rheostat,** enclosed pattern, to reduce heater input to about 50W, 25 × 3 cm tube, 265 ohm 1A. See entry in List No. sequence.

When ordering please state voltage and nature of electrical supply.

THERMOMETERS, IP see **THERMOMETERS**

All items on this page normally available from stock.

VAPOUR PRESSURE—REID METHOD—IP 69 and ASTM D323

VAPOUR PRESSURE LIQUID PETROLEUM GASES IP 161 and ASTM D1267

PH-500
VAPOUR PRESSURE BOMB, Reid immersion sampling type. Comprising air chamber and gasoline chamber with one opening. The volume ratio of the gasoline/air chamber is held to close limits and a bayonet coupling between the two chambers ensures a leak-proof seal against the neoprene gasket ... Each **£21. 0. 0.** *fS*

PH-510
VAPOUR PRESSURE BOMB, Reid pressure sampling type. Comprising air chamber, gasoline chamber with two openings, the lower section being connected through a gate valve and fitted with a needle valve ... ... Each **£31. 0. 0.** *f*

REPLACEMENT PART
PH-512 **Gasket,** for bayonet fitting for PH-500 and PH-510. Packet of 10 **£0. 8. 0.** *fS*

PH-520
PRESSURE GAUGES, test gauge quality, hand calibrated. Chromium plated case with plastics front, and fitted with carrying handles. Ranges zero to 5, 15, 30, 45, 60, 100 or 250 lb/in² ... ... Each **£12. 10. 0.** *f*

When ordering please state range required.

PH-530 **Mercury manometer,** to replace pressure gauges, with glass U-tube about 80 cm long, mounted on hardwood bench stand, with scale reading 400–0–400 mm, **without mercury** ... ... Each **£15. 0. 0.** *oS*

PH-532 **Manometer adapter** ... ... Each **£2. 0. 0.** *f*

PH-550
VAPOUR PRESSURE BOMB, LPG type, stainless steel. The main chamber is fitted with a stainless steel bleed valve and a liquid chamber of 20% relative capacity is fitted with a stainless steel filling valve. Each section is tested to 1000 lb/in² hydrostatic pressure. The stainless steel valve connects the two chambers when not in use. Each **£100. 0. 0.** *f*

PH-552
VAPOUR PRESSURE BOMB, LPG type, as PH-550 but with liquid chamber 33⅓% relative capacity. Each **£103. 0. 0.** *f*

PH-554 **Sampling connector,** 3 ft long and $\frac{5}{16}$ in outside diameter, with connector to fit inlet valve of bombs PH-550 and PH-552 ... ... Each **£6. 0. 0.** *f*

PH-562
PRESSURE GAUGES, for LPG bombs. The gauges are similar in construction to the Reid type (PH-520 etc.). Ranges zero to 120, 350 or 600 lb/in². Each **£12. 10. 0.** *f*

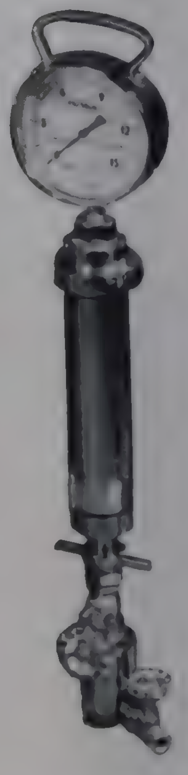
When ordering please state range required.

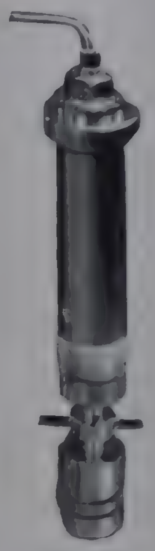
PH-580
THERMOSTATIC BATH, for 6 Reid or 4 LPG vapour pressure bombs. The bombs are suspended in a water bath heated by an immersion heater controlled by a bimetal thermostat operating through an electronic relay and 3-heat switch. Stirring is by an air bubbler. The top compartment, with hinged cover for easy access, houses the thermostat adjusting head and heater head, the relay being in a separate compartment in the base. The bath has a drain tap and constant level. Finished in stove enamel and mounted on castors. Power consumption 3 kW max. For 100/130, 200/220 or 220/250V a.c. single phase supplies only ... ... Each **£165. 0. 0.** *f*

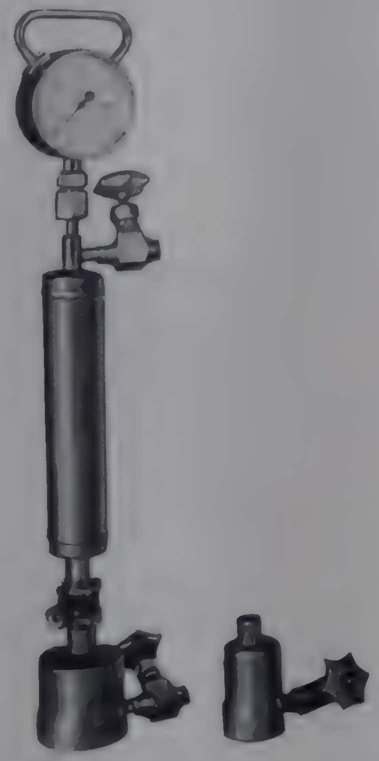
PH-584
SUPPORT, for bombs when fitted with manometer adapter PH-532 ... ... Each **£0. 15. 0.** *f*

REPLACEMENT PART
PH-586 **Heater** ... ... Each **£5. 15. 0.** *f*

When ordering please state voltage and nature of supply.


PH-510 with PH-520

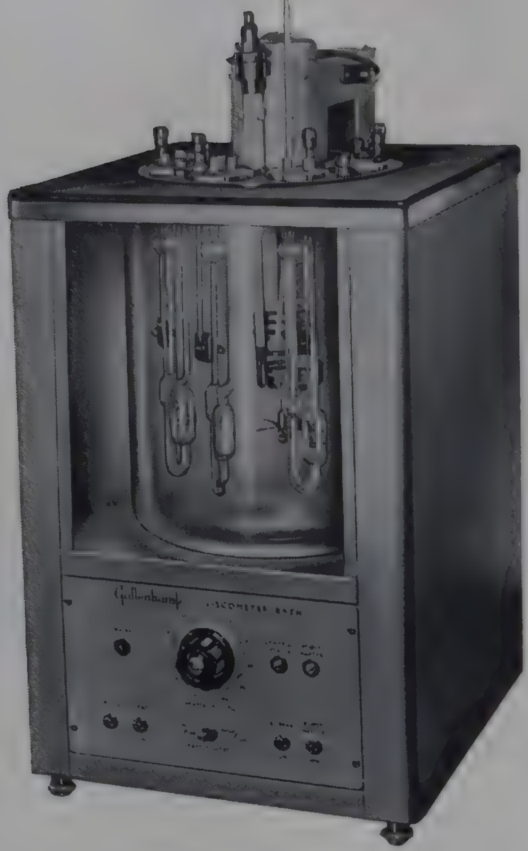

PH-500 with PH-532


PH-552 with PH-562

PH-580

Items on this page coded *S* normally available from stock.

Gallenkamp VISCOMETER BATH



VS-615 with accessories

VISCOSITY OF TRANSPARENT AND OPAQUE LIQUIDS (KINEMATIC AND DYNAMIC VISCOSITIES) ASTM D455-IP 71, BS 188

- Maximum operating temperature 120°C
- Unique turntable holder permits each viscometer to be brought to the front as required
- Convenient layout minimises operator fatigue
- Workpiece illuminated brilliantly but without glare
- Temperature controlled with maximum precision
- Designed for easy cleaning and simple maintenance
- Built-in boost for initial heating

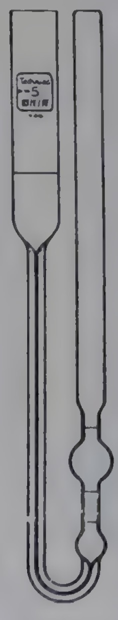
For full details see VS-615 in List No. sequence.

For similar Viscometer Bath for use up to 250°C see VS-670 in List No. sequence.

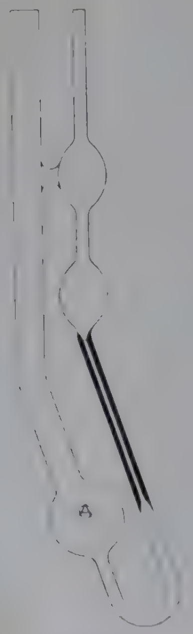
Technico VISCOMETERS

REGD. TRADE MARK

To ASTM D455—IP 71 and BS 188
See VS-220 to VS-315 in List No. sequence.



VS-250



VS-310

- Standard U-tube
- Reverse flow

- Suspended level
- Cannon-Fenske

Technician using a Gallenkamp thermostatically controlled water bath VS-615, for works standardisation of Technico U-tube viscometers.

Gallenkamp EVT VISCOMETER

For determination of the equi-viscous temperature of road tars, pitches, bitumens, etc. to STPTC RT 3.

Reference: G. H. Fuidge, A. L. Deadman and A. L. Hutton, Chemistry and Industry, 1948, pp. 601-602.

- **EVT obtained directly, accuracy ±0·2°C.**
- **Determinations independent of temperature susceptibility of tar**
- **One apparatus covers whole range of materials**
- **Only 7·5 ml sample, rapid temperature stabilisation**
- **Speedy operation, almost instantaneous readings**

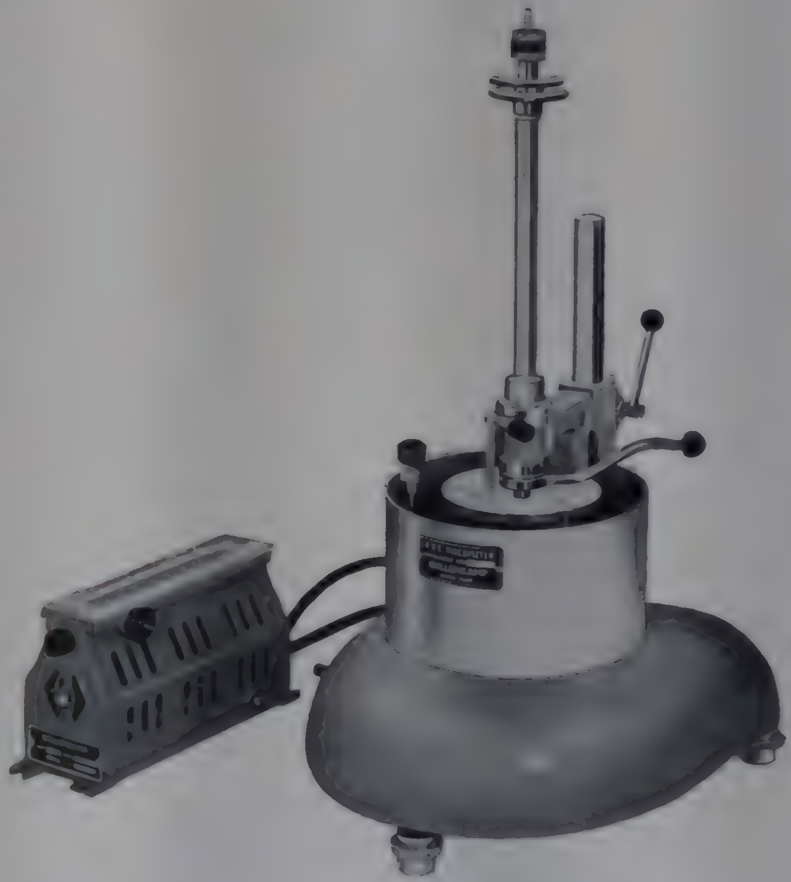
The *Gallenkamp* EVT viscometer was developed in co-operation with the South Eastern Gas Board. The equi-viscous temperature of a tar is the temperature at which the viscosity of the tar is 50 sec STV (about 200 Stokes).

SPECIFICATION

The sample is contained in a small cup in which a stainless steel cylinder, fitted with a graduated flywheel and suspended from a torsion wire, is free to rotate. The cup is completely immersed in a water bath fitted with a stirrer. The bath is heated by a clamped-on element which is controlled by a rheostat. The cylinder and suspension and the tar cup are mounted on a bracket which can slide vertically on a substantial rod attached to the main casting. The bracket can be locked in any position. The suspension can be locked by a rotating lever, and when so locked the cylinder and cup can be quickly detached for cleaning purposes without risk of damage to the torsion wire. The base is an aluminium casting fitted with levelling feet and stove enamelled. All other metal parts are chromium-plated and polished.

METHOD OF TEST

The correct quantity of sample, shown by a level gauge, is placed in the cup. The cup is fitted to the bracket and the sample then occupies the annular space between the cup and the cylinder. The suspension is lowered into the bath which is then slowly heated. The torsion head is periodically rotated sharply through 180°, stops being fitted for this purpose. The cylinder at first rotates slowly but as the EVT is approached it rotates more freely at each twist and eventually overswings by one division of the flywheel. The temperature at which this occurs is the EVT of the material.



PH-620

PH-620

VISCOMETER, EVT, *Gallenkamp*, **electrically heated,** complete with enclosed rheostat, instructions for use and certificate of calibration issued by the South Eastern Gas Board. **Without thermometer.**

For 220/240V a.c. or d.c. supplies ...	Each	**£121. 10. 0.**	*b*
For 200/210V a.c. or d.c. supplies ...	Each	**£121. 10. 0.**	*bN*
For 110/120V a.c. or d.c. supplies ...	Each	**£121. 10. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

PH-622	**Heater**	Each	**£0. 18. 0.**	*c*
PH-624	**Torsion wire**	Each	**£2. 1. 0.**	*b*

ACCESSORIES

TJ-154	**Thermometer, A.40C/100(STPTC T5c)**	For full details and prices see entries in List No. sequence.
TJ-154	**Thermometer, A.70C/100(STPTC T17c)**	

Items on this page normally available from stock except those coded *N.*

PH-640

STANDARD TAR VISCOMETERS FOR VISCOSITY OF REFINED TAR, STPTC RT2, RT3 and VISCOSITY-CUTBACK OF BITUMEN AND ROAD OIL, IP 72

PH-640

VISCOMETER, STANDARD TAR, for gas heating, comprising copper water bath with a heating tube and drain cock, standing on three legs fitted with levelling feet, stirrer, thermometer collar, 10 mm cup and valve. **Without thermometer or gas burner.**
Each **£28. 0. 0.** *f*

PH-642

VISCOMETER, STANDARD TAR, electrically heated, as PH-640 with 10 mm cup but water bath heated by an immersion element controlled by a protected rheostat. For 230/250V a.c. or d.c. supplies. **Without thermometer** ... ... Each **£43. 0. 0.** *f*

REPLACEMENT PARTS

PH-643	Immersion element	Each	£5. 0. 0.	*f*
PH-644	Cup, with 10 mm orifice	Each	£9. 0. 0.	*f*
PH-645	Valve, for 10 mm cup	Each	£2. 10. 0.	*f*

ACCESSORIES

PH-647	'Go/no-go' gauge, for checking orifice of 10 mm cup.	Each	£6. 10. 0.	*f*

TJ-154	Thermometer, A.40C/100(STPTC T5c)	For full details and prices see entries in List No. sequence.
TJ-154	Thermometer, A.70C/100(STPTC T17c)	
TK-514	Thermometer, IP 8F Redwood low ...	
TK-515	Thermometer, IP 8C Redwood low ...	

RECEIVERS, 100 ml capacity see CYLINDERS.

PH-660

VISCOSITY-BITUMEN ROAD EMULSION, IP 212 and BS 434

PH-660

VISCOMETER, Engler, electrically heated, comprising gold plated oil cup with stainless steel jet, mounted in a polished brass water bath. The oil cup with double walled lid is supported by an adjustable ring and the water bath with stirring device is mounted in a stand fitted with tripod legs with adjustable feet. A thermometer clip is fitted to the water bath and the oil cup lid has a thermometer socket. Supplied with plug valve for jet. **Without thermometer or flask.** For 100/130 or 200/250V a.c. supplies ... ... Each **£46. 0. 0.** *f*

When ordering please state voltage and nature of supply.

PH-662

RHEOSTAT, protected pattern ... Each **£8. 0. 0.** *f*

ACCESSORIES

FK-136	Flasks, Kohlrausch, 200 cm^3 ...	For details and prices see entries in List No. sequence.
SE-045	Sieves, meshes 22 and 60	
TK-640	Thermometer, IP 76C, two required	

VISCOSITY—REDWOOD, IP 70

PH-710

VISCOMETER, Redwood No. I, electrically heated, for light oils of viscosity not exceeding 2000 Redwood No. 1 seconds at the time of test. Comprises copper water bath with drain cock, stirrer with thermometer collar, silver plated oil cup with agate jet, ball valve, thermometer clip and spirit level and light alloy combined draught shield and stand, fitted with levelling screws. The cup is standardised against a cup calibrated by the National Physical Laboratory and a works certificate of test is issued.

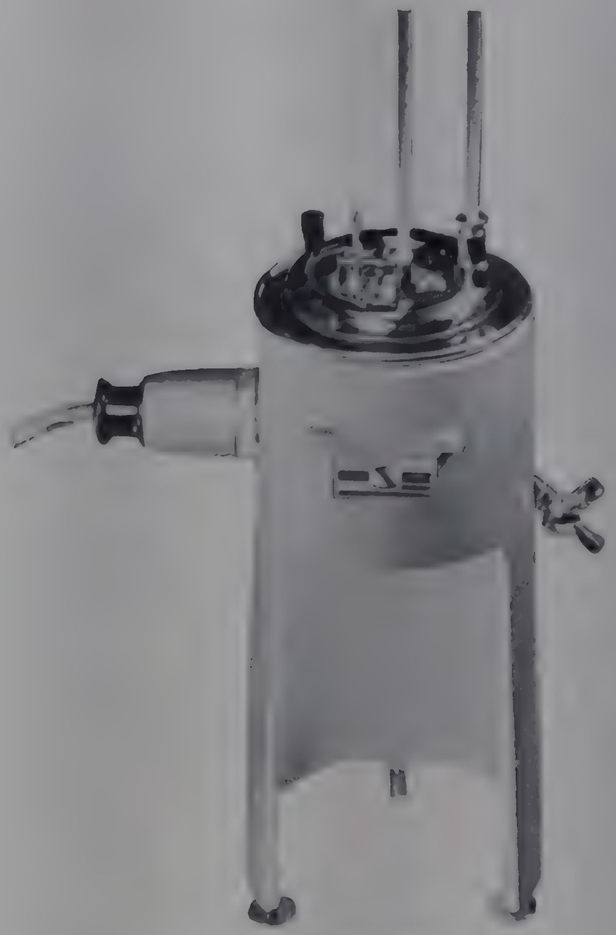
Without thermometers or flask.

For 200/250V a.c. supplies	Each	**£40.** 0. 0.	*mS*
For 100/130V a.c. supplies	Each	**£40.** 0. 0.	*m*

PH-711	**Control rheostat,** for PH-710 ...	Each	£9. 10. 0.	*mS*

REPLACEMENT PARTS

PH-720	**Oil cup, Redwood No. I,** for PH-710, with works certificate of test	Each	£15. 10. 0.	*f*
PH-724	**Immersion element,** for PH-710.	Each	£5. 0. 0.	*f*



PH-710

PH-740

VISCOMETER, Redwood No. 2, electrically heated, for oils of viscosity exceeding 2000 Redwood No. 1 seconds. Comprises copper water bath with drain cock, stirrer with thermometer collar, silver plated oil cup with agate jet, cover, ball valve, thermometer clip and spirit level and a combined draught shield and stand fitted with levelling screws. The cup is standardised against a cup calibrated by the National Physical Laboratory and a works certificate of test issued.

Without thermometers or flask.

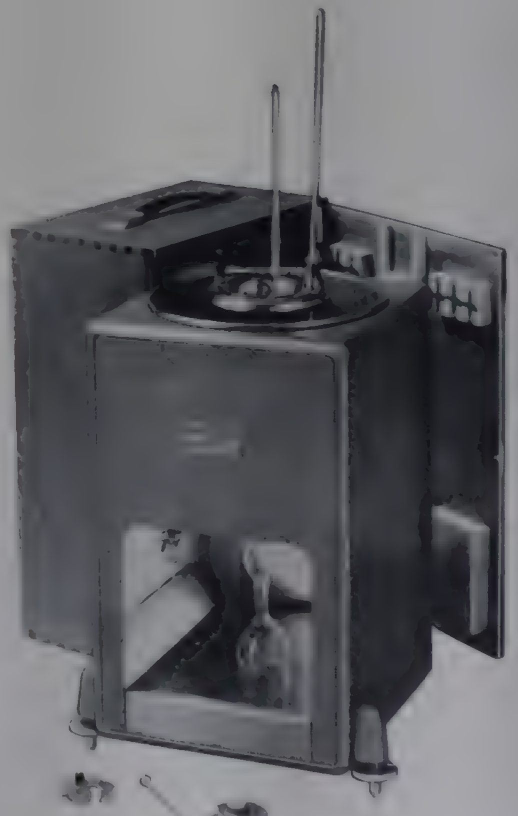
For 200/250V a.c. supplies	Each	**£65.** 0. 0.	*f*
For 100/130V a.c. supplies	Each	**£65.** 0. 0.	*f*

PH-741	**Control rheostat,** for PH-740 ...	Each	£9. 0. 0.	*f*

ACCESSORIES FOR REDWOOD VISCOMETERS

FK-134	**Flask, Kohlrausch,** *Technico,* **Class B,** 50 cm^3 ... ...
FK-136	**Flask, Kohlrausch,** *Technico,* **Class A,** 50 cm^3 ... ...
TK-514	**Thermometer,** IP 8F, Redwood low
TK-515	**Thermometer,** IP 8C, Redwood low
TK-516	**Thermometer,** IP 9F, Redwood medium ... ...
TK-517	**Thermometer,** IP 9C, Redwood medium ... ...
TK-518	**Thermometer,** IP 10F, Redwood high
TK-519	**Thermometer,** IP 10C, Redwood high

For details and prices see entries in List No. sequence.



PH-740

Items on this page coded *S* **normally available from stock.**

PH-900

WATER CONTENT—DEAN AND STARK METHOD, IP 74, BS 756 and ASTM D95

see **WATER DETERMINATION.**

WATER AND SEDIMENT—CENTRIFUGE METHOD, IP 75, ASTM D91, D96 and D1796

PH-900

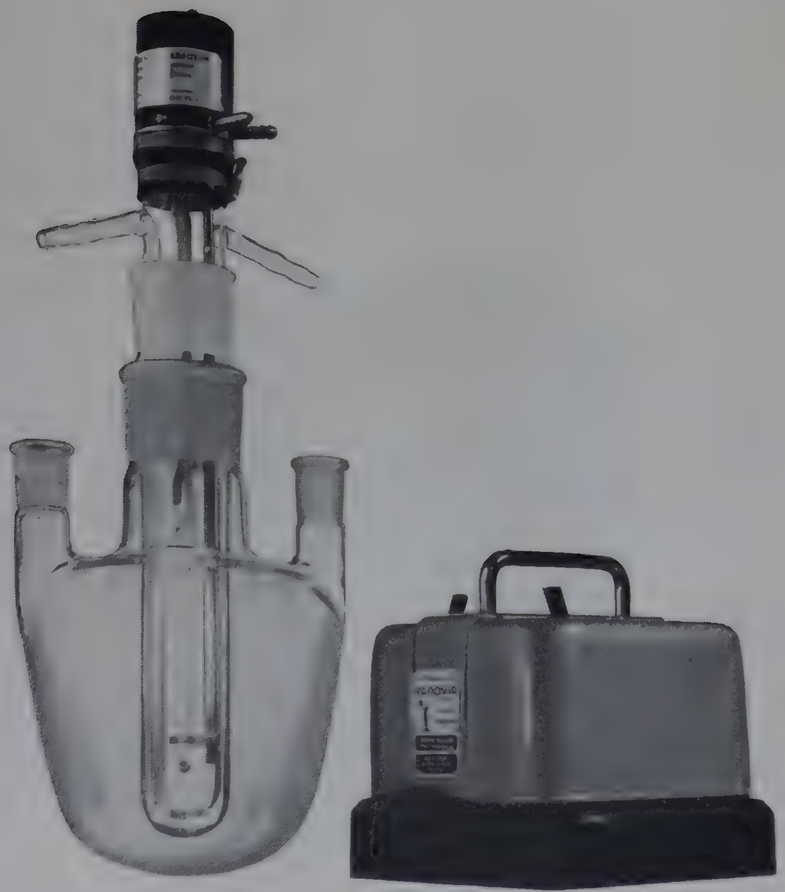
CENTRIFUGE, electrically driven, with 4-place head, totally enclosed in a spun steel guard which has a detachable lid held in place by three spring clips. Maximum speed 1500 rev/min. The 4-place head can accommodate 100 cm^3 cone-shaped centrifuge tubes PH-912. For a.c. single phase supplies. With head and buckets but **without glassware.**

For 200/250V	Each	**£66. 11. 9.**	*f*
For 110/120V	Each	**£67. 6. 9.**	*f*

PH-912

CENTRIFUGE TUBE, cone-shaped, *Pyrex brand,* 100 cm^3, graduated, to IP 75, ASTM D91, D96 (8 in) and D1796. Std. pack of 6 **£4. 5. 0.** Each **£0. 15. 10.** *dS*

PHOTOCHEMICAL REACTOR



PK-100

PK-100

PHOTOCHEMICAL REACTOR, 1000 ml, *Hanovia,* for small scale photochemical research using ultraviolet radiation including energy at 185 mμ. A three-necked glass flask, with 45/40 centre socket and 19/26 side sockets, holds a clear quartz thimble. The latter receives an inner clear quartz thimble which contains the UV lamp. The design permits water cooling of the space between the thimbles and nitrogen flushing of the lamp chamber to eliminate ozone and other gases. Both quartz thimbles have, opposite the lamp, a 75 mm long zone in high purity synthetic silica which transmits about 80% of the UV at 185 mμ for a thickness of 1 mm. A medium pressure 100W mercury arc lamp is included with electrode assembly and terminal housing, and cased control containing transformer, choke and limiting resistor with connecting lead. For 200/250V 50 Hz single phase supplies only ... ... Each **£105. 10. 0.** *fS*

REPLACEMENT PARTS

PK-102	**Flask, 3 neck,** borosilicate glass with 45/40 and two 19/26 sockets	Prices on application.
PK-103	**Outer thimble,** transparent quartz with 45/40 cone and 40/38 socket	
PK-104	**Inner thimble,** transparent quartz with 40/38 cone and water connections ...	

ACCESSORY

PK-120 **Lamp, low pressure UV,** 2W, in synthetic quartz, providing about 85% of UV output at 254 mμ and 185 mμ. Output at 254 mμ is approximately 0·5W. Includes cased step-up transformer. For 200/250V 50 Hz single phase supplies only ... ... Each **£43. 5. 0.** *f*

Items on this page coded S normally available from stock.

Technico
BS 1583
B
EX 20°C
MADE IN ENGLAND
100
cm³
10
cm³
25
5

Technico PIPETTES

REGD. TRADE MARK

One mark (bulb) pipettes to BS 1583
Graduated pipettes to BS 700

Class A pipettes are manufactured from borosilicate glass

Class B pipettes are manufactured from soda-lime glass

Jets and rate of flow

All jets have a uniform taper and wall thickness giving adequate mechanical strength, and are finished by fine grinding and bevelling in accordance with the recommendations of the appropriate British Standards.

Fairly wide tolerances on rates of flow for pipettes have become accepted and specified in British Standards because they are necessary for economic manufacture by conventional methods.

Technico pipette jets however are adjusted and timed by a process which makes accurate control possible. All *Technico* pipettes have a flow time near the minimum specified and thus offer a combination of speed and accuracy.

Clearly visible permanent inscriptions

Technico pipettes have screen printed inscriptions of high definition Borosilicate glass pipettes are marked with fired on white enamels of the highest chemical resistance. Soda-lime glass pipettes are marked with permanent interstitial metallic stains.

Robust construction

Machine drawn tubing of uniform bore and ample wall thickness is used exclusively for *Technico* pipettes. The manufacture of *Technico* bulb pipette blanks is carried out using mechanised methods which ensure a uniformly high quality at modest prices.

One mark pipettes 0·5 to 2 cm³ Class B and 0·5 and 1 cm³ Class A are made without bulbs in accordance with BS 1583.

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- Dispensing pipettes ... 622
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- Micro pipettes ... 620
- Syringe safety pipettes... 621

Exelo **pipettes** ... 621

Agla **micrometer syringe pipette** ... 620

Extract from BS 1583 'One-mark pipettes'

TOLERANCES ON CAPACITY						
Nominal capacity cm³	0·5	1	2	3	4	5
Class A tolerance ±cm³	0·005	0·007	0·01	0·015	0·015	0·015
Class B tolerance ±cm³	0·01	0·015	0·02	0·03	0·03	0·03
Nominal capacity cm³	10	15	20	25	50	100
Class A tolerance ±cm³	0·02	0·025	0·03	0·03	0·04	0·06
Class B tolerance ±cm³	0·04	0·05	0·06	0·06	0·08	0·12

Extract from BS 700 'Graduated pipettes'

TOLERANCES ON CAPACITY			
Nominal capacity	Subdivision	Class A tolerance	Class B tolerance
cm³	cm³	±cm³	±cm³
1	0·01	0·006	0·01
2	0·02	0·01	0·02
5	0·05	0·03	0·05
10	0·1	0·05	0·1
25	0·2	0·1	0·2

OTHER PIPETTES IN THE CATALOGUE

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Technico BULB PIPETTES

REGD. TRADE MARK

TO BS 1583

(Technical information see page 616)

PM-104

PIPETTES, *Technico,* one mark **Class B.**

To deliver	0·5 *	1 *	2 *	2·5†	3 cm³	
Dozen	**28/–**	**28/–**	**28/–**	**62/–**	**39/–**	*a*
Three	**7/10**	**7/10**	**7/10**	**16/6**	**10/3**	
Each	**3/10**	**3/10**	**3/10**	**6/4**	**4/8**	

To deliver	4	5	10	15	20 cm³	
Dozen	**42/–**	**39/–**	**42/–**	**51/–**	**51/–**	*a*
Three	**11/–**	**10/3**	**11/–**	**13/6**	**13/6**	
Each	**4/11**	**4/8**	**4/11**	**5/8**	**5/8**	

To deliver	25	30†	40†	50	100 cm³	
Dozen	**54/–**	**84/–**	**84/–**	**64/–**	**84/–**	*a*
Three	**14/3**	**22/–**	**22/–**	**17/–**	**22/–**	
Each	**5/10**	**8/–**	**8/–**	**6/6**	**8/–**	

PM-105

PIPETTES, safety, *Technico,* one mark **Class B,** with safety bulb in suction tube.

To deliver	5	10	20	25 cm³	
Dozen	**62/–**	**66/–**	**78/–**	**84/–**	*a*
Three	**16/6**	**17/6**	**20/6**	**22/–**	
Each	**6/4**	**6/8**	**7/8**	**8/–**	

PM-106

PIPETTES, *Technico,* one mark **Class A, borosilicate glass.**

To deliver	0·5 *	1 *	2	3	4	5 cm³	
Dozen	**78/–**	**78/–**	**84/–**	**96/–**	**96/–**	**90/–**	*a*
Each	**7/8**	**7/8**	**8/–**	**9/–**	**9/–**	**8/6**	

To deliver	10	15	20	25	50	100 cm³	
Dozen	**98/–**	**108/–**	**114/–**	**118/–**	**140/–**	**180/–**	*a*
Each	**9/–**	**10/–**	**10/3**	**10/9**	**12/9**	**16/6**	

PM-107

PIPETTES, *Technico,* one mark **Class A, with works certificate** showing value of correction, **borosilicate glass.**

To deliver	0·5 *	1 *	2	3	4	5 cm³	
Dozen	**116/–**	**116/–**	**120/–**	**135/–**	**135/–**	**130/–**	*a*
Each	**10/6**	**10/6**	**11/–**	**12/3**	**12/3**	**11/9**	

To deliver	10	15	20	25	50	100 cm³	
Dozen	**140/–**	**150/–**	**155/–**	**165/–**	**185/–**	**240/–**	*a*
Each	**12/9**	**13/6**	**14/–**	**15/–**	**17/–**	**22/–**	

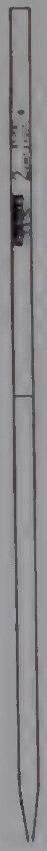
PM-108

PIPETTES, *Technico,* one mark **BST stamped Class A,** with certificate showing value of correction, **borosilicate glass.**

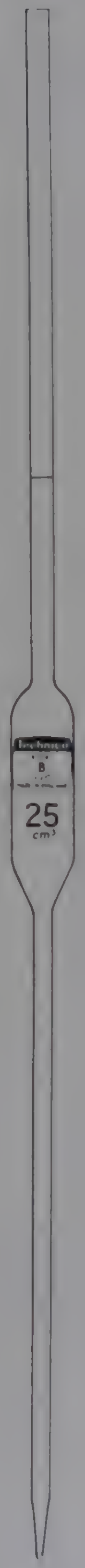
To deliver	1 *	2	5	10 cm³	
Each	**73/–**	**73/–**	**73/–**	**74/–**	*a*

To deliver	20	25	50 cm³	
Each	**75/–**	**76/–**	**78/–**	*a*

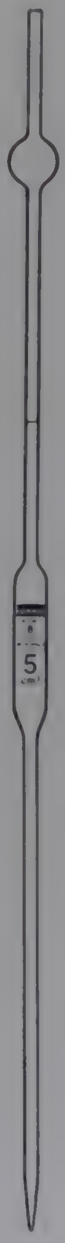
*** Straight pattern without bulb.**
† Size not included in BS 1583.



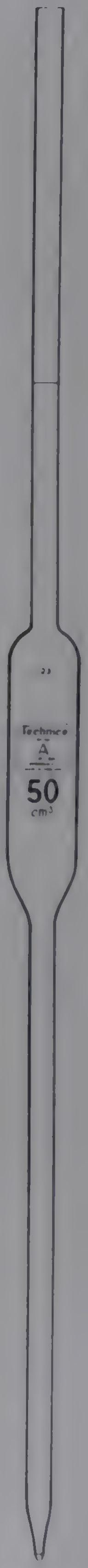
PM-104
0·5 to 2 ml



PM-104
sizes
above 2 ml



PM-105



PM-106
PM-107
PM-108

All items on this page normally available from stock.

Technico GRADUATED PIPETTES

REGD TRADE MARK

TO BS 700

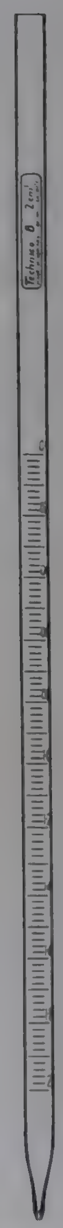
(Technical information see page 616)

PIPETTES, type 1. Calibrated for delivery from the zero line at the top, down to any graduation line. This type is intended for operation in a similar manner to a burette and **delivery should always commence from the zero line to obtain maximum accuracy.** In order to make possible the accurate control of the meniscus by this method, these pipettes have a longer delivery time than is specified for type 2.

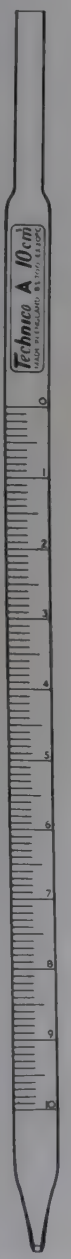
PIPETTES, type 2. Calibrated for delivery from any graduation line down to the jet, and intended for use to deliver a predetermined quantity by the same procedure as used for a one mark or bulb pipette. **Delivery should always be made down to the jet to obtain maximum accuracy.** These pipettes have a faster rate of flow than those of type 1.

PIPETTES, type 3. Calibrated to contain a given capacity from the jet up to the graduation line corresponding to that capacity. To obtain accurate transfer, the pipette should be dry before use and the contents rinsed out into the receiving vessel.

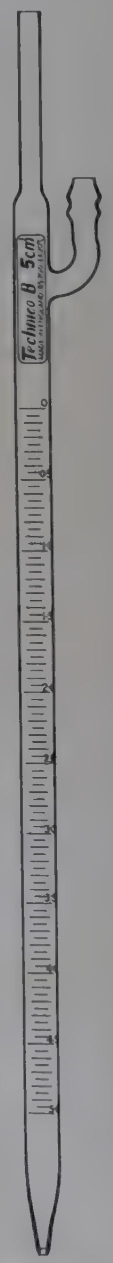
FAST DELIVERY PIPETTES. When pipettes faster than BS 700 type 2 are required we recommend ME-260 and ME-262, but the BS flow times are the fastest for which Class B accuracy can be guaranteed.



PM-344



PM-346



PM-404

List No.	Capacity cm³ Subdivided cm³		1 0·01	2 0·02	5 0·05	10 0·1	25 0·2	
	PIPETTES, Type 1 for delivery from zero at top down to any graduation line.							
PM-344	*Technico* **Class B**	Dozen Three Each	47/– 12/6 5/4	46/– 12/– 5/2	47/– 12/6 5/4	54/– 14/3 5/10	66/– 17/6 6/8	*a*
PM-346	*Technico* **Class A**	Dozen Each	180/– 16/6	180/– 16/6	190/– 17/6	205/– 18/6	225/– 20/6	*a*
	PIPETTES, Type 2 for delivery from any graduation line down to the jet.							
PM-364	*Technico* **Class B**	Dozen Three Each	47/– 12/6 5/4	46/– 12/– 5/2	47/– 12/6 5/4	54/– 14/3 5/10	66/– 17/6 6/8	*a*
PM-366	*Technico* **Class A**	Dozen Each	180/– 16/6	180/– 16/6	190/– 17/6	205/– 18/6	225/– 20/6	*a*
	PIPETTES, Type 3 for content from the jet to any graduation line.							
PM-384	*Technico* **Class B**	Dozen Each	54/– 5/10	51/– 5/8	54/– 5/10	59/– 6/2	74/– 7/4	*a*

SWALLOW PATTERN

Devised by Dr. A. J. Swallow† of Cambridge and Birmingham Universities, for use with radioactive and dangerous liquids. With a finger on top of the stem, a rubber teat is used to fill the pipette which is then adjusted and used in the normal manner. **The graduated portion conforms with Class B requirements of BS 700 Type 1.**

List No.	Capacity cm³		1	2	5	
PM-404	*Technico* **Class B**	Dozen Each	88/– 8/3	88/– 8/3	88/– 8/3	*a*

RV-220 **Rubber teats.** For price see entry in List No. sequence.

† Swallow 'Nature', **165**, 1950, 249.

All items on this page normally available from stock.

COREX® PIPETTES

Gallenkamp are appointed exclusive distributors in the United Kingdom of *Corex* products manufactured by the Corning Glass Works, Corning, New York, U.S.A.

Corex® is the trademark given by Corning to laboratory glassware made from a special type of glass and treated by a chemcor ion-exchange process which strengthens the glass chemically so that it becomes many times stronger than ordinary glassware.

Corex® glassware has a much greater surface hardness than ordinary glass and is so better able to resist the scratching and chipping which weaken ordinary glass and are a major cause of breakage, as well as constituting a danger from cross-contamination.

Corex ® graduations and inscriptions are as permanent as the glass itself and will remain sharply legible throughout the whole long life of the articles.

Corex® glassware is far more resistant to chemical attack than ordinary borosilicate, will withstand repeated steam sterilisation without visible clouding, and can be used up to 300°C without damage.

Any *Corex* pipette which becomes unserviceable in normal use within twelve months from date of purchase will be replaced free of charge.

VOLUMETRIC SPECIFICATIONS

Corex pipettes are manufactured to a very high quality to U.S.A. specifications which are on the whole very similar to the corresponding British Standards although there are some differences in sizes and a number of minor differences in dimensions and volumetric tolerances. In accordance with U.S.A. practice, pipettes to class A accuracy are so designated, it being understood that other pipettes without designation are class B accuracy. The limit of error applicable to each pipette is shown so that the purchaser can compare with the corresponding British Standard if desired.

***PM-430**

PIPETTES, long tip, *Corex* 7064A, with permanently marked graduations from zero line at top down to full capacity above shoulder of jet.

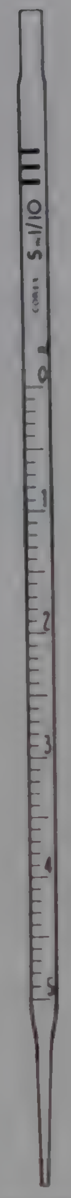
To deliver	0·1	0·2	0·5	1 cm^3	
Subdivided	0·01	0·01	0·01	0·01 cm^3	
Limit of error	0·005	0·008	0·02	0·02 cm^3	
Pack of 12	**400/–**	**380/–**	**460/–**	**360/–**	d
Each	**36/–**	**35/–**	**42/–**	**33/–**	
To deliver	2	2	5	10 cm^3	
Subdivided	0·1	0·01	0·1	0·1 cm^3	
Limit of error	0·02	0·02	0·04	0·1 cm^3	
Pack of 12	**420/–**	**450/–**	**410/–**	**470/–**	d
Each	**38/–**	**41/–**	**37/–**	**43/–**	

***PM-435**

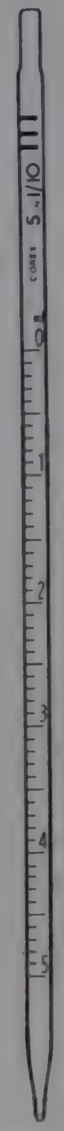
PIPETTES, Mohr type, *Corex* 7065A, with permanently marked graduations from zero line at top down to full capacity above shoulder of jet.

To deliver	0·1	0·2	1	1 cm^3	
Subdivided	0·01	0·01	0·1	0·01 cm^3	
Limit of error	0·005	0·008	0·02	0·02 cm^3	
Pack of 12	**350/–**	**350/–**	**320/–**	**340/–**	d
Each	**32/–**	**32/–**	**29/–**	**31/–**	
To deliver	2		5	10 cm^3	
Subdivided	0·1		0·1	0·1 cm^3	
Limit of error	0·02		0·04	0·06 cm^3	
Pack of 12	**350/–**		**380/–**	**410/–**	d
Each	**32/–**		**35/–**	**37/–**	

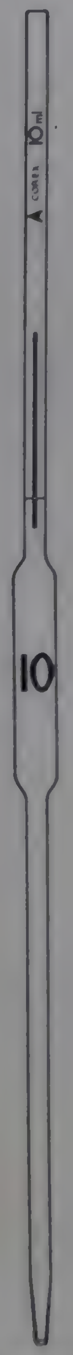
SEROLOGICAL PIPETTES, *Corex*, see ME-350, ME-352, ME-365 in List No. sequence.



PM-430



PM-435



PM-460

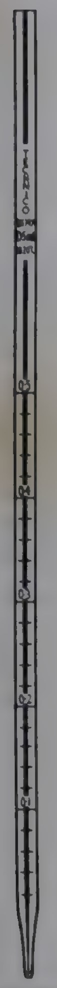
***PM-460**

PIPETTES, transfer, Class A, *Corex* 7100A, with permanently marked graduation line and bold clear figures.

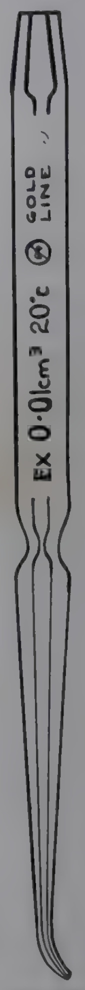
To deliver	1	2	3	4	5 cm^3	
Limit of error	0·006	0·006	0·01	0·01	0·01 cm^3	
Std. pack qty.	12	12	12	12	12	
Pack	**330/–**	**330/–**	**340/–**	**340/–**	**340/–**	d
Each	**30/–**	**30/–**	**31/–**	**31/–**	**31/–**	
To deliver	10	15	20	25	50 cm^3	
Limit of error	0·02	0·03	0·03	0·03	0·05 cm^3	
Std. pack qty.	12	6	6	6	6	
Pack	**350/–**	**275/–**	**285/–**	**295/–**	**360/–**	d
Each	**32/–**	**49/–**	**50/–**	**52/–**	**64/–**	

All items on this page normally available from stock.

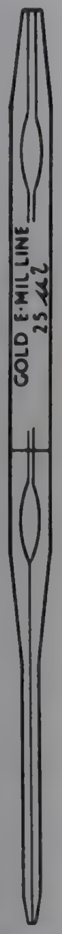
MICRO PIPETTES



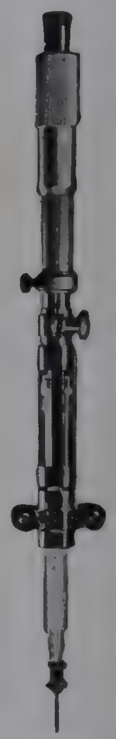
PM-496



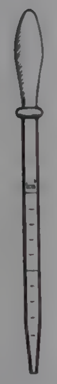
PM-526
PM-536



PM-546



PM-566



PM-584

PIPETTES, micro, *E-MIL*, with automatic zero caused by constriction in capillary.

Capacity	10	20	25	50	100	150	200	250 mm³	
Delivery tolerance ±	0·5	1	1	1	2	3	4	5 mm³	
Content tolerance ±	0·3	0·4	0·4	0·5	1	1·5	2	2·5 mm³	
PM-526 Calibrated for delivery Dozen	**106/-**	**106/-**	**106/-**	**106/-**	**106/-**	**106/-**	**106/-**	**106/-**	*m*
Each	**9/9**	**9/9**	**9/9**	**9/9**	**9/9**	**9/9**	**9/9**	**9/9**	
PM-536 Calibrated for content Dozen	**106/-**	**106/-**	**106/-**	**106/-**	**106/-**	**106/-**	**106/-**	**106/-**	*m*
Each	**9/9**	**9/9**	**9/9**	**9/9**	**9/9**	**9/9**	**9/9**	**9/9**	

PM-546

PIPETTES, ultramicro, *E-MIL*, Kirk pattern.

To contain	5	10	25	50	100 mm³	
Tolerance ±	0·05	0·1	0·2	0·25	0·5 mm³	
Dozen	**121/-**	**119/-**	**142/-**	**142/-**	**142/-**	*m*
Each	**11/-**	**10/11**	**13/-**	**13/-**	**13/-**	

Technico CAPILLARY MICRO

REGD. TRADE MARK

PIPETTES TO BS 1428 Part D4

PIPETTES, Type 1, subdivided, calibrated for delivery from the zero mark at the top down to any graduation mark.
Type 2, subdivided, calibrated for content from the jet up to any graduation mark.

List No.	Quality		0·1	0·2	0·5	
		Capacity cm³	0·1	0·2	0·5	
		Subdivided cm³	0·005	0·01	0·02	
		Tolerance ± cm³	0·002	0·004	0·006	
PM-486	*Technico* **Type 1,** for delivery	Dozen	**76/-**	**70/-**	**70/-**	*a*
		Each	**7/6**	**7/-**	**7/-**	
PM-496	*Technico* **Type 2,** for content	Dozen	**78/-**	**74/-**	**74/-**	*a*
		Each	**7/8**	**7/4**	**7/4**	

PIPETTES, Type 3, one mark calibrated for content.
Type 4, two marks calibrated for content.

List No.		*Technico* **Type 3**				**Type 4**		
	Capacity cm³	0·005	0·01	0·02	0·05	0·1	0·2	
	Tolerance ± cm³	0·0002	0·0002	0·0004	0·001	0·002	0·004	
PM-506	Dozen	**62/-**	**57/-**	**51/-**	**51/-**	**57/-**	**57/-**	*a*
	Each	**6/4**	**6/-**	**5/8**	**5/8**	**6/-**	**6/-**	

PM-566

PIPETTE, MICROMETER SYRINGE, *Agla*, comprising a 0·5 cm³ all-glass hypodermic syringe attached by a rigid holder to a micrometer screw which operates the piston. The micrometer head is direct reading to an accuracy of 0·00005 cm³. The syringe is fitted with a Luer type mount and is supplied complete with two metal needles in case ... ... Each **£12. 0. 0.** *f*

REPLACEMENT PART

PM-568	**Glass syringe,** comprising barrel and piston, with Luer nozzle	Each **£3. 11. 9.**	*f*

ACCESSORIES

PM-570	**Glass capillary needle,** straight pattern, Luer fitting.	Each **£0. 14. 6.**	*f*
PM-571	**Glass capillary needle,** right angle pattern, Luer fitting	Each **£0. 14. 6.**	*f*
PM-572	**Constant drop volume nozzle.**	Each **£1. 0. 0.**	*f*
PM-573	**Syringe holder,** with retort stand attachment and boss to fit on to ½ in retort stand rods.	Each **£4. 8. 0.**	*f*

DROPPING PIPETTES

PM-580

PIPETTE, dropping, ungraduated, approx. 1 ml, with teat.

Dozen packs **£5. 8. 0.** Pack of 12 **£0. 10. 0.** *a*

PM-584

PIPETTE, dropping, graduated 1 cm³ in 0·1 cm³, with teat ... Pack of 12 **£2. 11. 0.** Each **£0. 5. 8.** *a*

All items on this page normally available from stock.

SAFETY PIPETTES

A range of pipettes the upper end of which is a hollow piston on which slides a barrel with finger vent at the top. The pipette is filled above the mark by pumping and then finger operated in the normal way.

To deliver	1	2	5	10	25 cm³	
Syringe capacity	2	2	5	10	10 cm³	
PM-624 **PIPETTES,** *Exelo,* **one mark** Dozen	**254/–**	**254/–**	**312/–**	**377/–**	**380/–**	*m*
Each	**23/6**	**23/6**	**28/11**	**34/11**	**35/3**	
PM-634 **PIPETTES,** *Exelo,* **graduated** Dozen	**298/–**	**298/–**	**343/–**	**412/–**	**434/–**	*m*
Each	**27/7**	**27/7**	**31/9**	**38/2**	**40/3**	

A range of Class B graduated pipettes fitted with standard joint 7/11 sockets at upper end which accepts a plastics adapter for any stock syringe having a Luer fitting. One syringe can operate many pipettes. Breakage of pipette does not incur repair or loss of syringe.

PM-644

PIPETTES, graduated, *E-MIL* safety, as specification.

To deliver	1	2	5	10 cm³	
Subdivided	0·01	0·02	0·05	0·1 cm³	
Dozen	**79/–**	**79/–**	**68/–**	**68/–**	*m*
Each	**7/8**	**7/8**	**6/10**	**6/10**	

ACCESSORIES

PM-648	**Adapter,** plastics, with Luer fitting for syringe. Dozen **£1. 0. 0.** Each **£0. 3. 3.** *m*
SY-410	**Syringes,** all glass, Luer fitting. For details and prices see entry in List No. sequence.

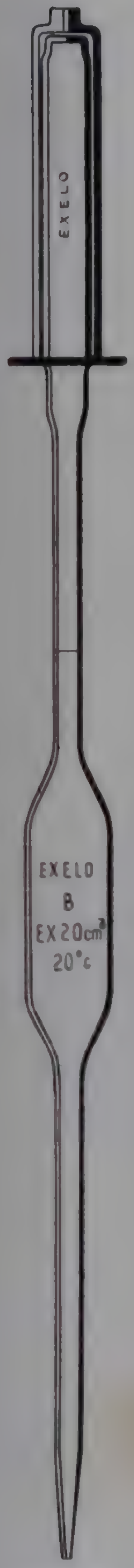
PIPETTE FILLER

PM-660

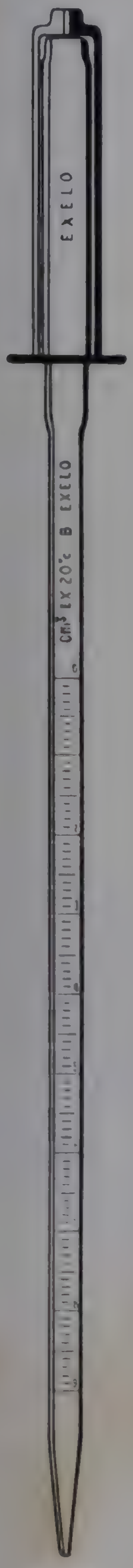
PIPETTE FILLER, *Griffin.* Comprising a moulded rubber bulb, approx. 60 ml capacity fitted with a 3-valve control unit containing plastics ball valves which can be precisely controlled by pressure between finger and thumb. There are no metal parts to corrode and the filler can be used for all liquids except those which attack rubber.

Can be used on bulb or cylindrical pipettes from 2 cm³ up to 50 cm³ capacity.

Dozen **£8. 9. 0.** Each **£0. 15. 6.** *m*



PM-624



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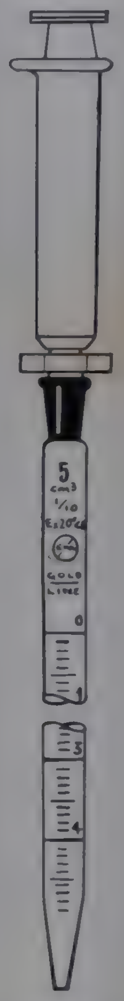


PM-644 with PM-648 and syringe

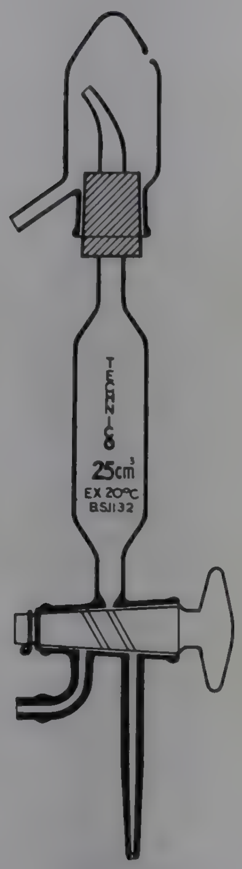
PM-660

PIPETTE STANDS	see STANDS
PIPETTE WASHING	see WASHING EQUIPMENT

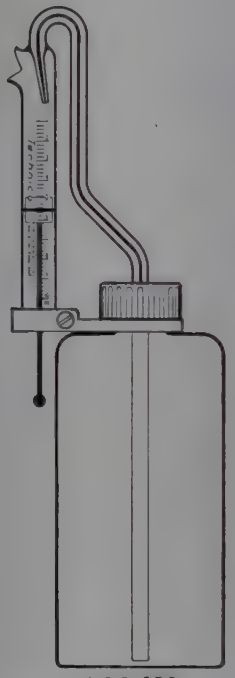
All items on this page normally available from stock.

Technico AUTOMATIC PIPETTES

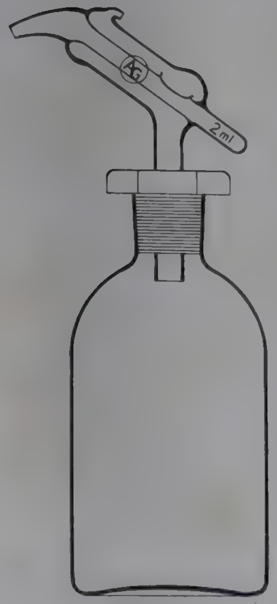
REGD. TRADE MARK



PM-664



PM-680



PM-714

PM-664

PIPETTES, Dafert automatic, *Technico*, to BS 1132, complete with overflow bulb fitted with rubber stopper. Stopcock fitted with retaining spring.

To deliver	5	10	25	50	100 cm³	
Tolerance ±	0·06	0·08	0·12	0·15	0·25 cm³	
Dozen	**330/–**	**340/–**	**350/–**	**430/–**	**480/–**	*a*
Each	**30/–**	**31/–**	**32/–**	**39/–**	**44/–**	

Spare retaining springs for stopcocks of above pipettes see ST-650 in List No. sequence.

PM-680

PIPETTES, AUTO-DISPENSING, *Technico*. Adjustable capacity pipettes with plastics reservoirs for the rapid dispensing of pre-set volumes of liquids. Each pipette comprises a robust precision bore graduated glass barrel fitted with a piston which can be set to any required dispensing volume. The piston head is fitted with a chemically resistant silicone rubber sealing ring. A siphon tube on the pipette provides automatic zero adjustment. The pipette is mounted on a wide based polythene bottle. By squeezing the bottle, the liquid rises in the pipette to a little above the zero mark and excess liquid is sucked back by the siphon tube when the bottle is released. The pre-set volume may then be simply poured out, the whole operation having taken only a few seconds.

Capacity	10	50 cm³	
Subdivision	0·2	1 cm³	
Reproducibility	0·1	0·5 cm³	
Bottle capacity	600	1200 ml	
Dozen	**430/–**	**620/–**	*a*
Each	**39/–**	**56/–**	

REPLACEMENT PART

PM-681 **Main glass part, with graduated barrel.**

Capacity	10	50 cm³	
Dozen	**285/–**	**440/–**	*a*
Each	**26/–**	**40/–**	

PM-704

PIPETTES, automatic tilting, for rapid dispensing of replicate volumes with approximate accuracy. Borosilicate glass.

To deliver	1	2	5	10 ml	
Dozen	**170/–**	**165/–**	**155/–**	**170/–**	*a*
Each	**15/6**	**15/–**	**14/–**	**15/6**	
To deliver	15	20	25	50 ml	
Dozen	**195/–**	**220/–**	**240/–**	**290/–**	*a*
Each	**17/6**	**20/–**	**22/–**	**26/6**	

PM-714

PIPETTES, as PM-704 but fitted with a 24/29 polypropylene stopper suitable for fitting to any reagent bottle or flask with a 24/20 or 24/29 ground neck. Complete with 500 ml reservoir bottle.

To deliver	1	2	5	10 ml	
Dozen	**210/–**	**205/–**	**195/–**	**210/–**	*a*
Each	**19/–**	**18/6**	**17/6**	**19/–**	
To deliver	15	20	25	50 ml	
Dozen	**235/–**	**260/–**	**280/–**	**330/–**	*a*
Each	**21/6**	**23/6**	**25/6**	**30/–**	

All items on this page normally available from stock.

AUTOMATIC DISPENSING PIPETTES

PM-754

PIPETTES, AUTO DISPENSING, *Quickfit*, for the rapid dispensing of preset volumes of liquids. The pipette delivers when the syringe plunger is depressed and refills automatically when the plunger is released. The volume dispensed is set by a simple screw clamp. Suck-back is prevented by a glass non-return valve and the liquid contacts only glass, PTFE and polypropylene components. Supplied complete with 750 ml amber glass reservoir bottle.

Capacity	5	10 cm³	
Type No.	5DA	10DA	
Each	£6. 10. 0.	£6. 15. 0.	*fS*

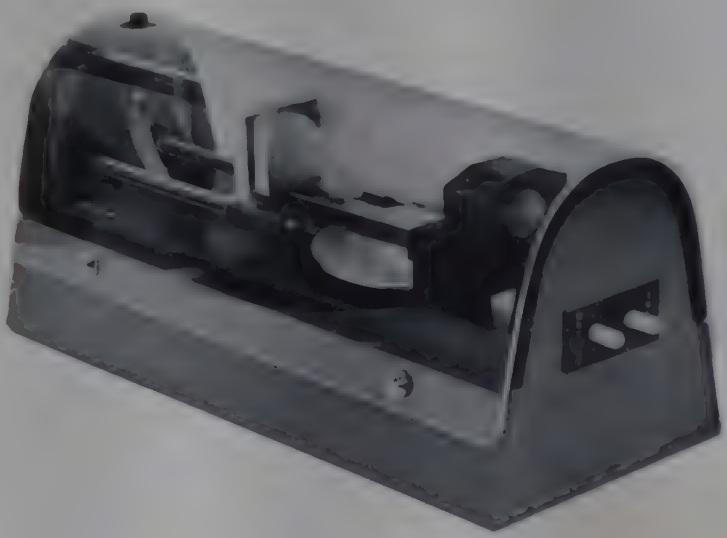
PM-754

PM-764

LIQUID DISPENSER, automatic, *Auto-Spenser*, comprising a standard 5 cm³ or 10 cm³ nylon syringe, driven by a synchronous motor. Delivery is adjustable either from 0·5 to 5 cm³ or 0·5 to 10 cm³ with a reproducibility within ±0·1%. A stainless steel valve ensures that no liquid flows back into the syringe and a Perspex window permits the syringe mechanism to be seen in operation. Liquid inlet and outlet nozzles, a press button for single cycle operation and an adaptor for foot switch accessory are provided. Overall dimensions 23×10×10 cm. Weight 1·6 kg. Complete with one nylon syringe, and instructions for use. For 200/250V 50 Hz supplies.

Syringe capacity	5	10 cm³	
Each	£25. 0. 0.	£25. 0. 0.	*m*

A glass syringe can be fitted to special order.



PM-764

REPLACEMENT PARTS AND ACCESSORIES

PM-766 **Foot switch assembly** ... ... Each £3. 7. 6.

PM-768 **Syringes,** nylon.

Capacity	5	10 cm³	
Each	21/-	24/-	m

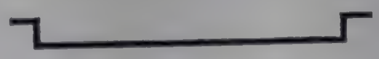
NOTE: The nylon syringes are suitable for sterilisation at a temperature not exceeding 120°C.

PLANCHETS

PP-100

PLANCHET, flat aluminium source tray for lead castles. Overall dia. 26 mm, inside dia. 23 mm, depth 1·75 mm,

10 packs	£8. 10. 0.	*mS*
Pack of 100	£0. 18. 6.	

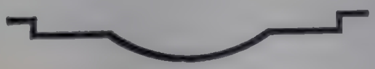


PP-100

PP-104

PLANCHET, as PP-100 but dimpled.

10 packs	£8. 10. 0.	*mS*
Pack of 100	£0. 18. 6.	



PP-104

Items on this page coded *S* normally available from stock.

PLANIMETERS

PP-220

PP-220

PLANIMETER, Allbrit, fixed index pattern, with fixed length tracer arm covering maximum radial range of 22 in. In case with hand magnifier, checking rule and instructions ... ... Each **£24. 0. 0.** *f*

PP-240

PLANIMETER, Allbrit, sliding bar pattern, with measuring wheel carriage adjustable for different bar lengths to give direct readings independent of scale. The bar is engraved with an arbitrary scale and settings are made by a vernier, fitted with a fine adjustment, attached to the measuring wheel carriage. In case with adjustable magnifier, calibration table and instructions. Each **£27. 0. 0.** *f*

PLASTICS MATERIALS

General properties of common synthetic resins. (Common names and abbreviations in accordance with BS 3502).

Apart from their susceptability to chemical attack, plastics can also be very sensitive to their environments. Strong sunlight or low concentrations of organic vapours can be sufficient to cause superficial crazing or even complete failure, usually along undetectable lines of internal strain. Most often affected in this way are acrylic, polystyrene, and polythene but generally this potential disadvantage is outweighed by the advantages of mechanical strength and low price.

Type of resin	Usual mechanical properties and appearance	Approx. max. working temp.°C	Flammability	Sterilisation		Attacking reagents	
				Air at 160°C	Steam at 121°C	Water, acids and alkalis	Common organic solvents
Polythene, low density	Flexible, opaque	90	Slow burning	No	No	Oxidising acids (conc.)	Hydrocarbons and chlorinated hydrocarbons particularly above 60°C
Polythene, high density	Semi-rigid, opaque	110	Slow burning	No	No	Oxidising acids (conc.)	
Polypropylene	Rigid, translucent	140	Slow burning	No	Yes	Oxidising acids (conc.)	Hydrocarbons and chlorinated hydrocarbons particularly above 80°C
TPX (polymethylpentene)	Rigid, clear or pigmented	180	Slow burning	Yes	Yes	Oxidising acids (conc.)	Hydrocarbons and chlorinated hydrocarbons
PVC, rigid (vinyl)	Rigid, pigmented	70	Self extinguishing	No	Some grades	None	Ketones, cyclic ethers, chlorinated hydrocarbons and deplasticising solvents
PVC, plasticised (vinyl)	Very flexible, clear or pigmented	50	Self extinguishing	No	Some grades	Slight water absorption	
Polystyrene	Brittle, clear	85	Slow burning	No	No	Oxidising acids (conc.)	Most
Acrylic (Perspex, PMM)	Rigid, brittle, clear	70	Slow burning	No	No	Conc. acids	Ketones, esters and chlorinated hydrocarbons
Polycarbonate	Rigid, clear	130	Very slow burning	No	Yes	Conc. acids and alkalis (slight attack)	All except aliphatic hydrocarbons
Nylon (Polyamide)	Rigid, opaque	120	Self extinguishing	No	Yes	Water (absorbed) and acids	Phenols
PTFE	Rigid, opaque	300	Non-flammable	Yes	Yes	None	None
Melamine	Rigid, pigmented	110	Non-flammable	No	No	Conc. acids and alkalis	None

All items on this page normally available from stock.

PLASTICS SUNDRIES

See also **RUBBER SUNDRIES** page 685.

SEALING MATERIALS

PP-520

SEALING TISSUE, *Parafilm*, a flexible, waterproof, thermoplastic material which has many uses in the laboratory, such as the provision of economical temporary seals for glassware. It is clean and simple to use and, once wrapped round an article, it can be sealed into position by the heat and pressure of the hand. The material can be used to seal irregularly shaped articles with sharp edges thus protecting the contents from contamination. Parafilm is resistant to most common acids, alkalis and inorganic solutions. It has a low water vapour permeability and can therefore be used to protect materials from both evaporation and adsorption of water. In 15 metre rolls, interleaved with paper to prevent sticking.

Width	5	45 cm	
Dozen rolls	74/–	620/–	*c*
Roll	7/4	56/–	

PP-525

SEALING TAPE, PTFE, which can easily be stretched over stoppers and ground joints or the mouths of tubes, bottles etc., to form chemically inert closures. The tape can be sterilised in steam. In 10 metre rolls 5 cm wide.
Roll **£1. 10. 0.** *c*

POLYTHENE FILM

PP-532

FILM, polythene, 500 gauge, 0·13 mm thick, for airtight wrapping and storage of chemicals, instruments and general apparatus.

Width	120	180 cm	
Dozen yds	18/6	25/–	*c*
Yard	3/2	3/8	

POLYTHENE FILM ENVELOPES

PP-540

ENVELOPES, polythene film, 150 gauge, 0·04 mm thick. These envelopes have many uses in the laboratory and can be hermetically sealed with a hot iron. In packs of 100.

Size	7·5×12·5	10×15	12·5×20 cm	
10 packs	40/–	33/–	31/–	*c*
Pack	5/4	4/9	4/7	

Size	17·5×23	20×30	25×38 cm	
10 packs	52/–	66/–	98/–	*c*
Pack	6/6	7/8	10/9	

For suitable sealing iron see PP-770 in List No. sequence.

PP-544

BAGS, polythene film, re-sealable. These bags are made with a rim/channel sealing device which can be closed by finger pressure and reopened repeatedly. The closure (on the shorter dimension of the bag) is reasonably dustproof but not guaranteed airtight. With write-on panel. In packs of 100.

Size	9×11·5	10×14	12·5×18·5 cm	
Pack	11/6	14/6	19/6	*c*

POLYTHENE POWDER

PP-560

POWDER, polythene, high density, white, for applying protective coatings. The article to be coated should be pre-heated to temperatures between 170 and 300°C and rolled in the powder. Any loose dust is shaken off and the surface then fused to a smooth coat at 170°C. In pack of 500 g.
Ten packs **£6. 5. 0.** Pack **£0. 13. 6.** *b*

NOTE: This material is suitable for the preparation of pressed polythene disks for Infrared Spectroscopy as described by B. Smethurst and D. Steele in Spectrochimica Acta 1964. **20**(^{2}) 242.

SHEET

PP-620

SHEET, cellulose acetate, non-inflammable, in sheets, size 54×24 in (138×61 cm). Thickness 0·015 in (0·38 mm) ... ... Each **£1. 2. 6.** *m*

PP-624

SHEET, Perspex, colourless transparent. In rectangular pieces

Dimensions	24×18			36×24 in			
Thickness	1/16	1/8	3/16	1/8	3/16	1/4 in	
Each	18/–	18/–	24/–	36/–	48/–	60/–	*m*

Sheets can be cut to any required dimensions up to a maximum of 72×48 in, in thicknesses as above and also 3/8 and 1/2 in. The price per piece will depend on the amount of wastage in cutting from standard sheets.

ADHESIVE TAPES

PP-740

TAPE, cellulose, transparent, for sealing, masking, fastening and strengthening. In 30 metre rolls 2·5 cm wide on 2·5 cm core ... ... Roll **£0. 5. 0.** *c*

PP-744

TAPE, PVC, transparent, a thin flexible tape of high chemical resistance which can withstand autoclaving. For masking, protecting and sealing. In 30 metre rolls on 2·5 cm core.

Width	1·9	2·5 cm	
Roll	5/6	5/9	*m*

EB-780

INSULATING TAPE, polythene. For details and price see entry in List No. sequence.

PP-750

TAPE DISPENSER, high impact polystyrene, for 2·5 cm core diameter tapes from 1·2 to 2·5 cm width.
Each **£0. 4. 6.** *m*

PLASTICINE

PP-760

PLASTICINE, a plastic moulding clay useful for many purposes in the laboratory.
10 lbs **£1. 13. 0.** 1 lb **£0. 4. 9.** *c*

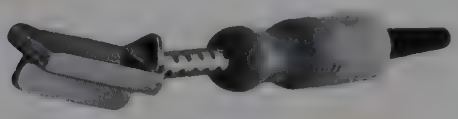
All items on this page normally available from stock.

PP-770

SEALING IRON, for sealing polythene and other plastics films. A 30W element heats a shaped sole adequately to form 3 mm wide seals between two films of polythene at about 2 cm/sec. The films to be welded are placed between two layers of barrier tape and the iron is drawn across the surface of the upper layer. Supplied with mains cable, roll of barrier tape which may be re-used many times and a handy rest which can be screwed to the bench to protect the latter from the heat of the iron. For 230/250V supplies ... ... Each **£3. 17. 6.** *m*

REPLACEMENT PART

PP-772 **Barrier tape** ... ... Roll of 1 m **£0. 11. 6.** c



PP-770

PP-780

***PP-780**

WELDING TORCH, for welding polythene, PVC or other thermoplastics. The torch operates on bottled butane or propane gas and the combustion gases serve as the heat vehicle for welding. This avoids the necessity of having a compressed air or nitrogen supply and the torch is easier to manipulate with only one gas hose. The torch is fitted with gas control valve and must be used with a gas regulator giving a gas pressure of 14 lb/in^2. Supplied complete with four interchangeable jet tubes, 2 metres flexible hose with unions, two spanners and detailed instruction manual ... Each **£7. 16. 6.** *m*

ACCESSORIES

GD-531	**Pressure regulator** with inlet for propane gas cylinders.	For prices and details see entries in List No. sequence.
GD-568	**Adapter** for use with above, with flat flange connection for butane cylinders.	

PP-792

WELDING ROD, polythene, $\frac{1}{8}$ in diameter.

100 yds	**£1. 17. 0.**	*m*
10 yds	**£0. 5. 2.**	

PP-793

WELDING ROD, PVC, $\frac{1}{8}$ in diameter.

80 yds	**£2. 1. 0.**	*m*
10 yds	**£0. 6. 4.**	

PLATES

PR-310

PLATES, unglazed porous porcelain, circular with shallow rim. For drying crystals, etc.

Top dia.	8	12	21 cm	
Gross	**165/–**	**190/–**	**380/–**	c
Dozen	**15/–**	**17/6**	**35/–**	

PR-346

PLATES, white *Technolite*, square, edges smooth and bevelled. Thickness approx. 10 mm.

Side	10	15	20 cm	
Dozen	**44/–**	**76/–**	**130/–**	c
Each	**5/–**	**7/6**	**11/9**	

PR-350

PLATES, *Vitreosil* unglazed translucent silica, square, approx. 3 mm thick.

Side	10	15 cm	
Each	**7/9**	**18/–**	*m*

PR-355

PLATE, spot test, *Royal Worcester* porcelain, glazed, with twelve cavities. Dimensions 11·5×8·5 cm.

Each **£0. 7. 0.** *d*

PR-365

PLATE, spot test, rigid PVC, white, with twelve cavities. Dimensions 11·5×9·5 cm.

Dozen **£1. 18. 0.** Each **£0. 4. 7.** *m*

PLATINUM

All platinum goods listed throughout this catalogue and the platinum foil and wire listed below are sold according to the current market price of platinum.

PR-660

PLATINUM FOIL. Width 26 mm, thickness 0·05 mm.

Linear cm **£0. 17. 6.** c

***PR-680**

PLATINUM WIRE.

No.	1	2	3	4	5	
Thickness	0·005 0·127	0·009 0·229	0·012 0·305	0·015 0·381	0·020 in 0·508 mm	
Foot	**8/–**	**12/–**	**22/–**	**34/–**	**59/–**	*m*

No.	6	7	8	9	
Thickness	0·025 0·635	0·030 0·762	0·035 0·889	0·040 in 1·015 mm	
Foot	**92/–**	**129/–**	**182/–**	**234/–**	*m*

PLATINUM, basins	see	BASINS
,, **, crucibles**	see	CRUCIBLES
,, **, wire holder**	see	CX-560 under CULTURE APPARATUS

All items on this page normally available from stock.

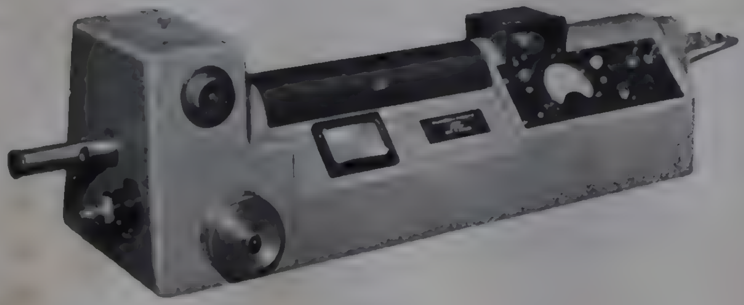
POLARIMETERS

High precision photoelectric Polarimeter

This instrument has been designed specifically for photoelectric detection of the balance condition and is not a modification of a visual polarimeter.

Light entering the instrument is plane polarised by a prism mounted in a divided circle, passes through the sample and is received by an oscillating analyser. Light transmitted through this system falls on the cathode of a photomultiplier cell in whose anode circuit is placed the sensing meter.

Specific rotation may be measured for any monochromatic beam between 2300 Å and 6000 Å and is direct reading to 0·002 angular degrees. Standard sample tubes are used and may be up to 220 mm long and down to 5 mm bore. A stabilised E.H.T. source for the photomultiplier is incorporated.



PS-200

PS-200
PHOTOELECTRIC POLARIMETER, *B & S*, 'Pepol 60', as above specification. Fully detailed descriptive pamphlet on application ... ... Each **£940. 10. 0.** *f*

Polarimeter Model D

For testing sugar solutions and other optically active liquids.

PRINCIPLE

The polarimeter comprises a pair of polarisers arranged in line, one of which can be rotated with respect to the other, the amount of rotation being measured by a divided circle. When the polarising planes are mutually perpendicular, no light is transmitted but, on introduction of a tube containing optically active liquid, transmitted light is seen to an extent measured by the rotation of one polariser to a position where light is no longer transmitted.

The instrument is fitted with an illuminated 10 cm diameter glass circle divided in degrees, decimals being read to 0·05° by a 29 mm diameter drum. The drum is inscribed also with a sugar scale reading directly to 0·1 sugar degree. The instrument takes tubes up to 220 mm length and is intended for use with sodium light, a suitable filter being included in the optical system.

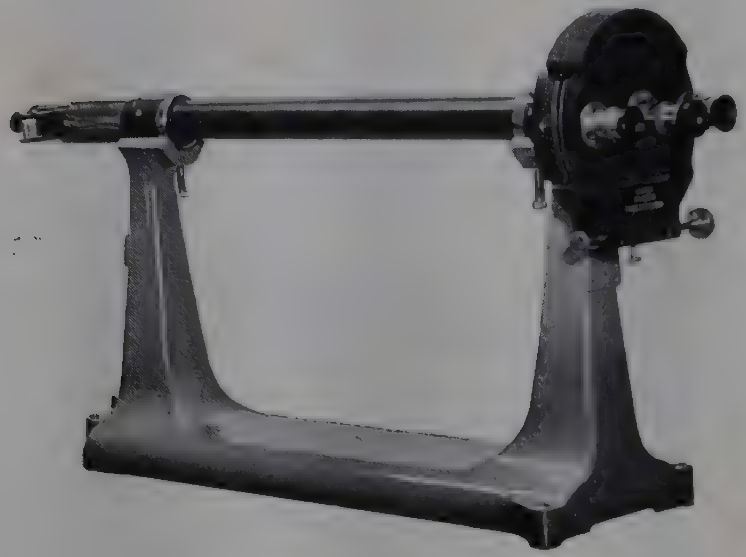
PS-430 with lamp PS-475

PS-430
POLARIMETER, *B & S*, **Model D2,** as specification, with angular and sugar scales and one tube PS-512 up to 220 mm length ... ... Each **£133. 0. 0.** *f*

PS-435
POLARIMETER, *B & S*, **Model D4,** as specification, with angular and sugar scales, front focusing and one tube PS-512 up to 220 mm length ... Each **£133. 0. 0.** *f*

For suitable polarimeter tubes and sodium lamp see overleaf.

POLAROGRAPHS see
ELECTROCHEMICAL ANALYSIS



PS-450

Polarimeter Model A

A modern and accurate instrument which can be used in the ultra-violet region and for rotary dispersion measurements with specific accessories as well as for the normal polarimetric work.

The instrument is fitted with a glass circle carrying the dividing line which is etched indelibly into the glass and with its vernier, readings to 0·01° can be made. The observation telescope does not rotate with the circle which is of great advantage when making rotary dispersion measurements. The Lippich design polariser has a variable half shadow adjustment.

PS-450

POLARIMETER, *B & S,* **Model A No. P1,** as specification, for tubes up to 400 mm length, reading by double vernier to 0·01°. Fitted with variable half shadow polariser adjustment ... ... Each **£260. 0. 0.** *f*

Models fitted with fixed half shadow polariser for use in the UV region and micrometer screw attachment for higher accuracy are available. Details on application.

PS-475

SODIUM LAMP, 45W, with jacket and transformer for mounting on base of polarimeters PS-430, PS-435 and PS-450 ... ... Each **£33. 5. 0.** *f*

When ordering please state for which polarimeter.

POLARIMETER TUBES

PS-510

POLARIMETER TUBES, cementless, water jacketed tubes for inversion measurements.

PS-512

POLARIMETER TUBES, glass, non-rolling observation tubes with hexagonal detachable ends.

The above tube can be supplied in brass if required.

PS-514

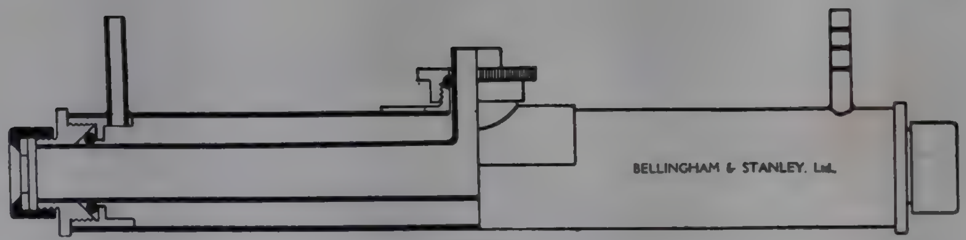
POLARIMETER TUBES, glass, non-rolling observation tubes, with bulb for bubble.

PS-516

POLARIMETER TUBES, with straight centre filler.

PS-518

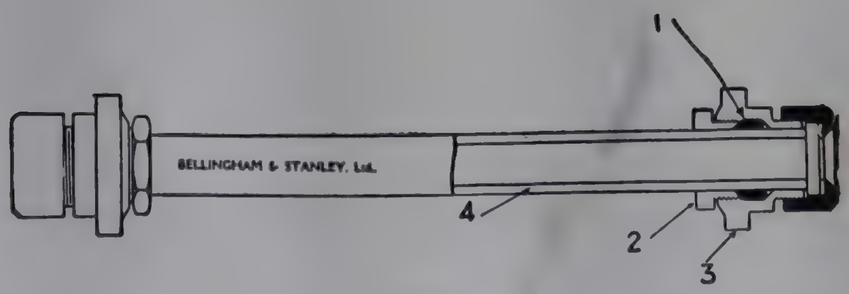
POLARIMETER TUBES, with cup shape centre filler.



PS-510

List No.	PS-510	PS-512	PS-514	PS-516	PS-518	
Tube length mm	Each	Each	Each	Each	Each	
50	432/–	64/–	67/–	86/–	96/6	*f*
100	332/6	42/6	45/–	57/6	67/6	*f*
200	332/6	42/6	45/–	57/6	67/6	*f*
220	332/6	42/6	45/–	57/6	67/6	*f*
400	373/–	46/6	48/6	63/–	72/–	*f*

NOTE: 50 mm tubes have cemented ends.



PS-512

1. Packing gland
2. Clamping nut
3. Hexagonal end piece
4. Easily renewable tube

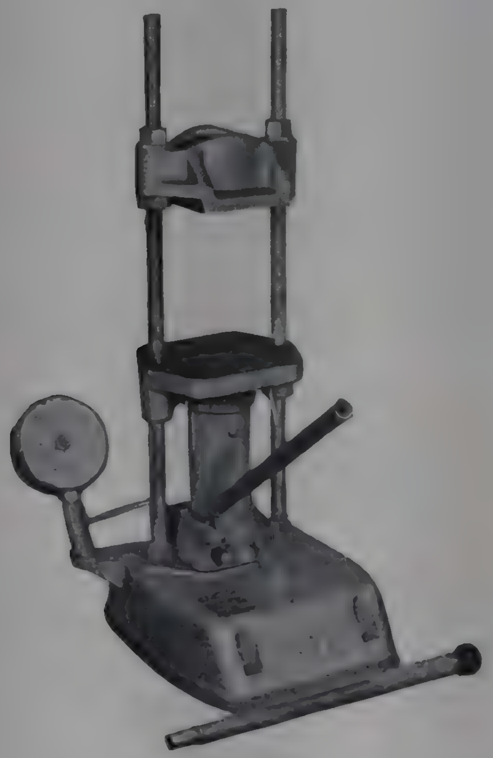
REPLACEMENT PARTS

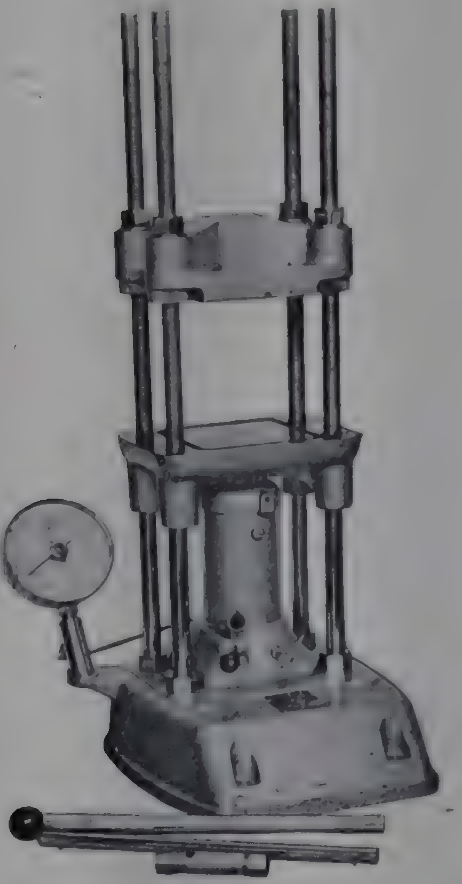
PS-520	**Glass disks, diameter 15·5 mm.** Dozen	**£2. 12. 6.**	*fS*
PS-525	**Rubber washers, diameter 15·5 mm.** Dozen	**£0. 2. 6.**	*fS*

Other polarimeter tubes, accessories and spares are available, details and prices on application.

Items on this page coded *S* normally available from stock.

POLISHES **POLISHING CLOTHS**	see CLEANING MATERIALS
PORTABLE LABORATORY	see QUICKFIT APPARATUS
POTENTIOMETERS	see ELECTRICAL INSTRUMENTS
POTOMETER	see BIOLOGICAL SCIENCES
POWER PACK	see ELECTRICAL CONTROLS


PU-020


PU-025

HYDRAULIC PRESSES

FOR RESEARCH, CONTROL OF PRODUCTION AND PROCESS DEVELOPMENT

Total load 10 tons

APPLICATIONS

For extrusion, lamination, vulcanisation, briquetting, plastics moulding, pressure dehydration and filtration of viscous liquids, embossing, fibre and pulp board forming, separation of liquids from solids such as mother liquors from crystals, liquor from pulps, fluids from animal tissue, extracts from plants and drugs, expression of animal, fish and vegetable oils and the pressing of stearins and waxes.

These presses are suitable for tests, such as crushing, breaking, extrusion, compression, flow and shearing tests, pressure-temperature moulding tests and spring testing, fatty acid determinations, oil content of seeds and extraction control.

CONSTRUCTION

The robust steel press is a self-contained bench type instrument with hand pump and oil storage for the built-in ram. The rising platen has a drainage groove and a delivery pipe for expressed liquids. The head of the press is adjustable for height and can be set in the most convenient position. A two-part handle 30 in long is fitted, the short handle being used for rapidly closing the press. By adding the extension, the force can be slowly increased by making short pumping strokes.

PRESSURE MEASUREMENT

An inclined pressure gauge is fitted and has direct reading scales for total load and hydraulic pressure, maximum pressure indicator and a zero reset device. Range covered is 0 to 22,000 lb in 44 divisions and readings are accurate to ±3%.

DIMENSIONS

Platens	6×7 in. (15×18 cm)
Hydraulic lift	6 in (15 cm)
Overall dimensions	37×17×18 in (94×43×46 cm)

PU-020

PRESS, hydraulic, Model A1, as specification, with two columns ... ... Each **£120. 0. 0.** *fS*

PU-025

PRESS, hydraulic, Model A14, as specification, with four columns for more accurate alignment of the platens. Each **£135. 0. 0.** *f*

ACCESSORY EQUIPMENT FOR PU-020 and PU-025. Accurate results are obtained easily in a variety of operations by using these presses in conjunction with standardised accessory equipment listed below.

Operation	Accessory equipment	List No.
Crushing tests	Swivel bearing plates	**PU-040**
Hot pressing	Hotplates	**PU-055**
Separation of liquids from solids	Equipment cage	**PU-080**
	Plate and cloth equipment	**PU-085**
Expression of oils	Test cylinder outfits	**PU-090**

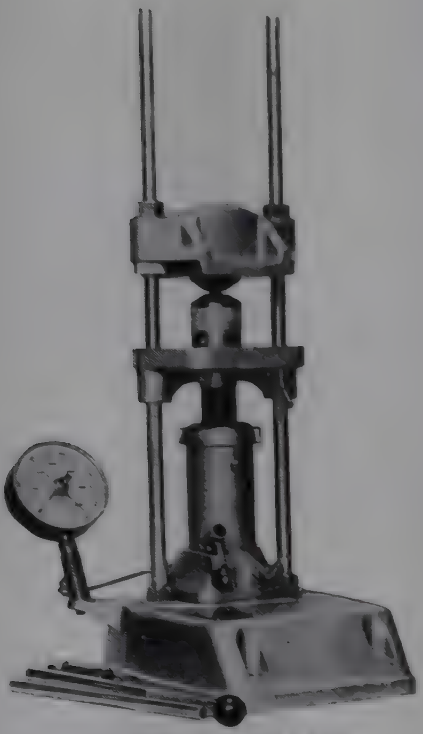
For details of accessories see overleaf.

Items on this page coded *S* normally available from stock.

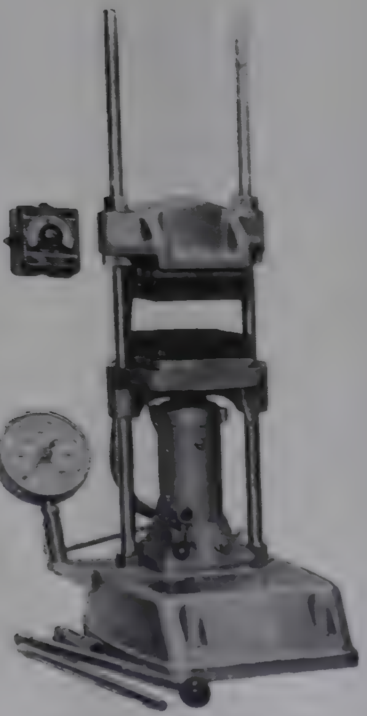
ACCESSORY EQUIPMENT FOR CRUSHING TESTS

PU-040

PLATES, SWIVEL BEARING, for providing a uniform load for crushing tests. These plates are carried on the head of the press and swivel on a hardened steel ball. A single plain bearing plate locates on the lower platen. All the plates have centring lines on their faces for positioning the specimen and are removable. Set **£14. 10. 0.** f



PU-020 with PU-040



PU-020 with PU-055

ACCESSORY EQUIPMENT FOR PLASTICS, RUBBER AND HOT PRESSING

For hot pressing work in plastics moulding, laminated board production, test cures of rubber mixes, and similar applications, the press can be fitted with hotplates PU-055.

PU-055

HOTPLATES, electrically heated, 6×6 in, controlled by a heat controller giving variable temperature control up to 200°C. The controller is fitted in a panel for mounting on the press. The setting is determined for each application and when set gives accurate control suitable for the most sensitive processing. For 220/240V a.c. single phase supplies ... ... Set of two **£70. 0. 0.** f

REPLACEMENT PART

PU-056 **Heating elements** ... ... Set **£4. 10. 0.** f

ACCESSORY

PU-076 **Thermometer,** with 7·5 cm scale in brass case, angle type, 0 to 200°C ... ... Each **£4. 0. 0** f

ACCESSORY EQUIPMENT FOR SEPARATION OF LIQUIDS FROM SOLIDS

PU-080

PERFORATED CAGE, for use with **fibrous and hard materials,** capacity 1150 ml. Constructed with drainage channels directing the liquid to a groove in the rising table. With plunger, cast-iron ejector, three perforated plates and three felt pads ... Set **£60. 0. 0.** f

PU-085

PLATE AND CLOTH, for use with **pulpy materials,** comprising six drainage plates, twelve filter cloths and one 5 in former used to make uniformly square cakes of material ... ... Set **£12. 0. 0.** f

ACCESSORY EQUIPMENT FOR EXPRESSION OF LIQUIDS,

and extrusion tests, briquetting and moulding.

When used for expression of oil from ground material, hotplates PU-055 should be used. This method enables oil samples for analysis to be obtained more rapidly than by the extraction or percolation methods.

PU-090

TEST CYLINDER OUTFIT, 1⅛ in dia. (1 in²). 3 in deep. Comprises steel cylinder, base pad, plunger and U-shape ejector, stainless steel pan for collecting liquid and ten filter pads of prepared felt for confining wet materials. All steel parts are plated to resist corrosion ... ... Each **£15. 0. 0.** f

PU-095

TEST CYLINDER OUTFIT, as PU-090 but 2¼ in dia. (4 in²) ... ... Each **£26. 0. 0.** f

ACCESSORY EQUIPMENT for extrusion test, flow tests, plastics moulding tests, determination of oil and moisture in paraffin and other waxes and for powder metallurgy are also available. **Full details and prices on application.**

HYDRAULIC PRESSES with total loads of from 20 to 150 tons also available. **Full details and prices on application.**

PU-110

BENCH PRESS, hydraulic, maximum pressure 5 tons. A totally sealed jack built into an open gap press frame with a steel plate over the ram head to form the press platen. The platen is spring loaded to return to the lowest position when pressure is released and runs in guides which are calibrated in inches. The press head comprises a changeable tool holder and a load indicator is fitted. Operation is by a front hand lever which also releases the pressure when it is revolved. Bolting down holes are provided for fixing to a firm base. Overall height 63 cm including load indicator. ... Each **£50. 0. 0.** *m*

PU-110

SODIUM WIRE PRESS

PU-180

PRESS, sodium wire, with hardened steel ram and mould 17 mm dia., complete with two moulds of 0·5 and 1·0 mm orifice diameter respectively.
Each **£25. 10. 0.** *b*

REPLACEMENT PARTS

PU-183 Steel mould, with orifice 0·5 mm dia., to accept 17 mm ram ... ... Each £3. 4. 0. *b*

PU-184 Steel mould, with orifice 1·0 mm dia., to accept 17 mm ram ... ... Each £3. 4. 0. *b*

TABLET PRESSES

PU-200

TABLET PRESS, for 5 mm dia. tablets, with hardened steel ram and die ... ... Each **£4. 4. 0.** *c*

PU-202

TABLET PRESS, as above, but for 2 mm dia. tablets.
Each **£4. 4. 0.** *c*

PRESSES, Botanical	see	BIOLOGICAL SCIENCES
, Cork	see	CORK ACCESSORIES
, Filter	see	FILTER PRESSES
, Metallurgical	see	METALLURGY

PU-180

PU-200

PROJECTORS

PV-410

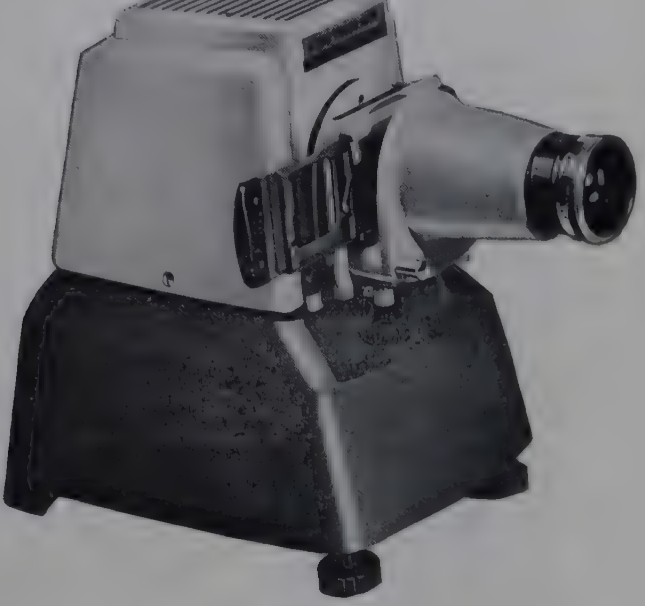
AUTOMATIC SLIDE PROJECTOR for 35 mm slides in standard mounts with remote controls for fine focus and slide advance in a compact moulded plastics housing on a 3 metre extension cable. Brilliant white light is produced by the 24V 150W tungsten-iodine-quartz lamp which is cooled by a quiet running high speed fan. Uniform slide illumination results from the use of an aspheric and a biconvex condenser lens and the *Chance* heat filter protects slides from heating effects.
The projection lens is 10 cm *f*2·8, hard coated on all glass/air surfaces. Its focal length is particularly suitable for use in lecture theatres, small halls, classrooms, etc. With one 36 slide magazine and A1/216 projector lamp. For 220/250V a.c. single phase supplies.
Each **£34. 4. 6.** *m*

PV-410

ACCESSORY

PV-415 Carrying case, with zip closure ... Each **£2. 8. 2.** *m*

All items on this page normally available from stock.



PV-421

PROJECTORS

(continued)

A versatile 2×2 in slide projector which, with accessories, may be immediately converted to accept film strips and microscope slides, and is suitable for projection in large public halls. A powerful electric blower in the base cools the lamp and prevents overheating of the slides. Adjustable front feet allow the projected image to be tilted from side to side as well as adjusted for height. The optical system includes a single condenser and a 10 cm *f*2·8 hard coated anastigmatic lens which is focused by a spiral movement.

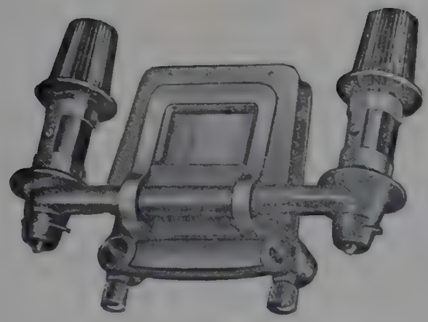
PV-421

SLIDE PROJECTOR, *Aldis,* for 2×2 in slides, as specification, with 1000W lamp. For 210/250V a.c. single phase supplies ... ... Each **£35. 3. 0.** *mS*

REPLACEMENT PART

PV-431	**Projection lamp,** 1000W	Each **£3. 6. 0.** *mS*

When ordering please state voltage and nature of supply.

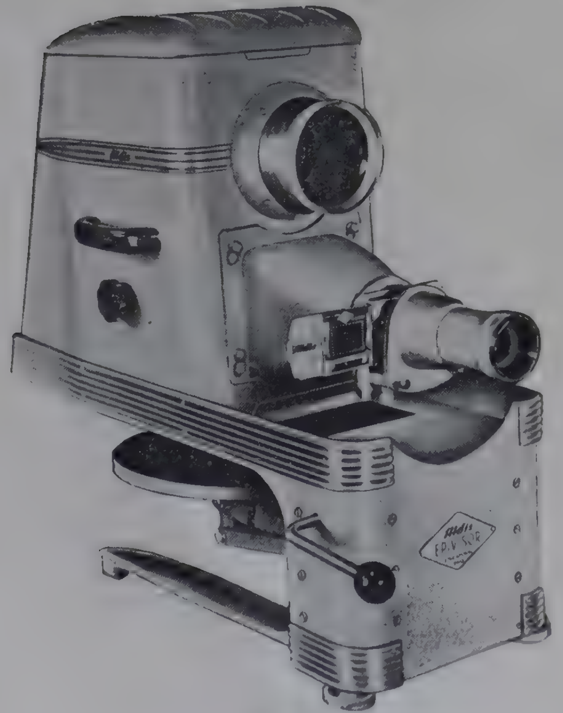


PV-440

PV-445

ACCESSORIES

PV-440	**Filmstrip carrier,** for 35 mm film strips, which are engaged by metal springs	Each **£3.16. 0.** *m*
PV-445	**Micro-slide attachment,** with iris diaphragm and 3·5 cm *f*3 lens. Projects a 10 ft picture at 14 ft.	Each **£23.12. 6.** *m*
PV-450	**Automatic slide changer,** with one magazine containing 36 slide frames	Each **£4.15. 0.** *m*
PV-451	**Adapter,** for fitting slide changer to slide projector PV-421	Each **£0. 7. 6.** *m*
PV-452	**Magazine,** with 36 slide frames.	Each **£0.14. 9.** *m*
PV-455	**Carrying case,** fitted, for slide projector PV-421.	Each **£4.10. 0.** *m*



PV-492

EPIVISOR EPIDIASCOPE

The *Epivisor* is suitable for visual aid work in education and industrial training. Fitted with a 1000W lamp and cooling fan, it projects film strips, slides, drawings, photographs, maps, charts and book pages, an area up to 5×5 in being projected by the episcope. An important feature of the *Epivisor* is the facility for instantly removing the entire upper section in order to place it on large flat subjects such as maps or blueprints. The projector then slides smoothly across the surface on polished feet, projecting that portion of the subject which is beneath the viewing aperture.

PV-492

EPIDIASCOPE, *Aldis Epivisor,* as specification, with 35 cm *f*4 lens for episcope projection and 10 cm *f*2·8 lens for 2×2 in slides, complete with lamp for a.c. single phase supplies ... ... Each **£118. 2. 6.** *m*

REPLACEMENT PART

PV-496	**Projection lamp,** 1000W ..	Each **£3. 2. 0.** *m*

When ordering please state voltage and nature of supply.

Items on this page coded *S* **normally available from stock.**

CLOSED-CIRCUIT TELEVISION

A complete outfit for

- **Demonstrating small items or hazardous experiments**
- **Projection microscopy**
- **Observation of industrial processes**

A high definition assembly of camera and 17 in monitor supplied complete with cable and connectors. Controls are as simple to operate as a domestic television receiver, and the use of printed circuits throughout leads to reliability in service.

Camera and monitor can be up to 3000 ft apart, enabling remote observation and control of industrial processes, and complete safety of operators. More advanced equipment is also available, including cameras controllable from the monitor position, weatherproof housings etc. Further information can be supplied against details of the application.

CAMERA

A fully transistorised unit using a scanning standard of 625 lines and 50 fields/sec. The spectral response is similar to panchromatic film and good quality pictures are obtained with illumination levels of 8 ft lamberts. The camera must not be operated at ambient temperatures in excess of 40°C.

A 2·5 cm *f* 1·9 lens is supplied, giving an angle of view of 28°, but the standard 'C' type mounting enables other 16 mm cine lenses to be used. $\frac{1}{4}$ in Whitworth fixing holes are provided in the base for mounting purposes.

Dimensions without lens are 9 × 15·5 × 31·5 cm long, weight 4 kg.

MONITOR

Type 171 video monitor is housed in a plastics case and has a 110° radiant screen tube.

Up to six cameras may be simultaneously connected to the monitor, a selector switch giving immediate choice of picture. Controls provided are ON/OFF, brightness and contrast.

Cabinet dimensions 55 × 39 × 35 cm.

Picture size 38 × 29 cm.

SERVICE

In the U.K. the outfit is delivered, set up and demonstrated by engineers from one of 30 local *Pye* service depots, who ensure the equipment is working satisfactorily. Maintenance contracts may be arranged, but this is not essential, and spares and repairs are promptly available from the local depot.

Details of export service arrangements on application.

ACCESSORIES

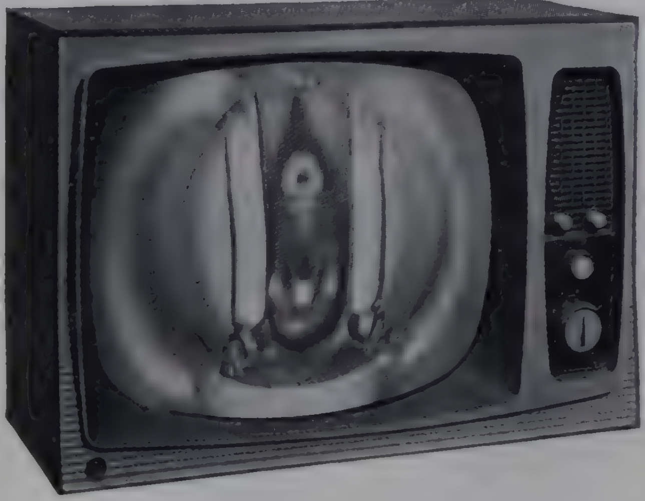
Additional cameras, giving choice of observation point, and additional monitors (up to 8 can be operated simultaneously from a single camera) for larger audiences, can be supplied.

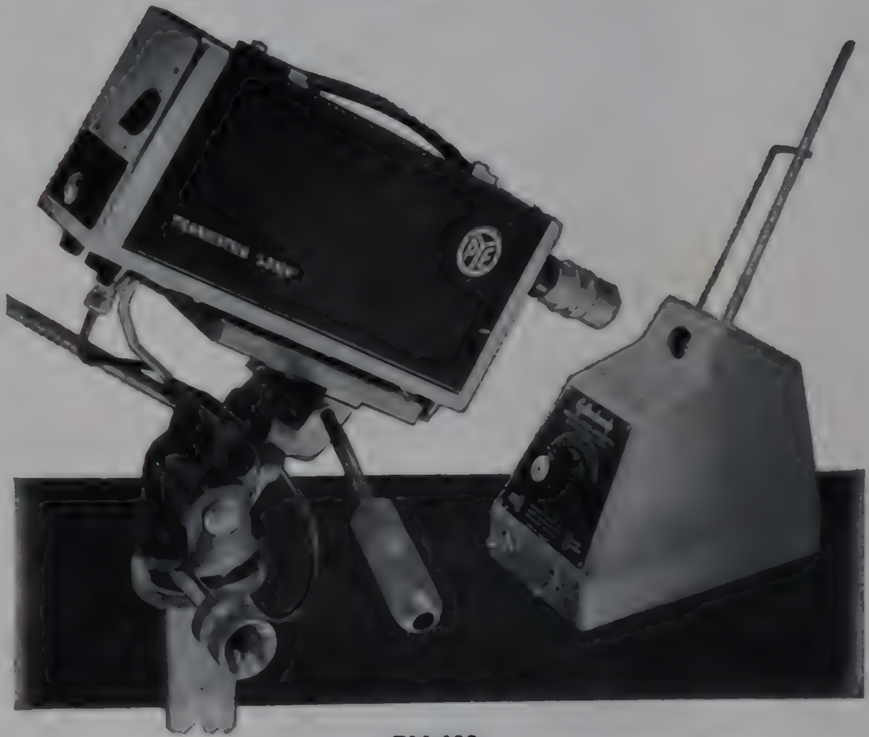
Alternative camera mountings, remote controls and extra lenses are available.

PV-600

TELEVISION OUTFIT, *Pye*, as specification including camera, monitor, plugs and 25 ft coaxial cable, for operation on 200/250V 50 Hz supplies ... Each **£255. 0. 0.** *f*

Price includes delivery, setting up and one month's servicing in U.K. only. Export price on application.





PV-600

Demonstration of melting point determination with MF-370 using the PV-600 outfit.

ACCESSORIES

PV-620	**Camera,** additional	Each **£160. 0. 0.**	*f*
PV-630	**Monitor,** additional	Each **£79. 0. 0.**	*f*
PV-640	**Tripod,** with pan and tilt head and adjustable legs, for mounting camera	Each **£18. 14. 4.**	
PV-642	**Clamp,** for permanently mounting camera.	Each **£10. 0. 0.**	*f*
PV-650	**Lens,** 5 cm, giving angle of view 14°.	Each **£27. 19. 11.**	*f*

PUMPS

Aquarium aerators	see **AIR PUMPS**
Pumps, air	see **AIR PUMPS**
Pumps, carboy	see **CARBOY ACCESSORIES**
Pumps, chemical	see **WATER PUMPS**
Pumps, chromatographic	see **CHROMATOGRAPHY**
Pumps, filter	see **FILTER PUMPS**
Pumps, vacuum	see **VACUUM PUMPS**
Pumps, water	see **WATER PUMPS**

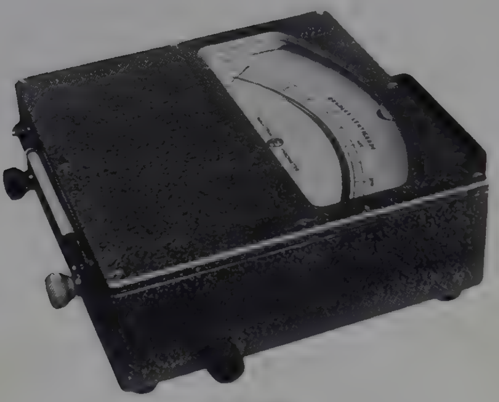
PYROMETER INDICATORS

PX-020

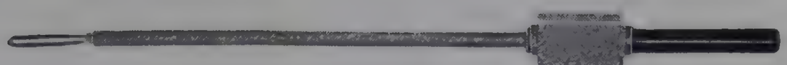
PX-022

0
200
400
600
800
1000
1200
°C
Gallenkamp

PX-040



PX-050
PX-095



PX-054

PX-055

MAXIMUM TEMPERATURE 400°C

PX-020

PYROMETER, portable, with 7 cm dual scale calibrated **0–200 and 0–400°C.** Complete with thermometer for ambient temperature correction and pistol grip copper-constantan needle thermocouple. In wood carrying case. Each **£33. 5. 0.** *m*

ACCESSORY

PX-022 **Thermocouple, copper-constantan, surface contact,** approximately 25 cm long with plastics handle and 1·5 m of flexible compensating cable ... Each **£7. 3. 0.** *m*

MAXIMUM TEMPERATURE 1200°C

PX-040

PYROMETER, flush mounting, 7 cm rectangular scale, range **0–1200°C. Requires but does not include a chromel-alumel thermocouple** Each **£7. 10. 0.** *m*

ACCESSORY

PX-042 **Bench stand** ... ... Each **£1. 13. 0.** *m*

PX-045

PYROMETER, bracket mounting, 10 cm scale, range **0–1200°C.** With automatic cold junction compensation. **Requires but does not include a chromel-alumel thermocouple** ... ... Each **£16. 0. 0.** *m*

For illustration see opposite page.

PX-050

PYROMETER, portable, 20 cm scale, range **0–1200°C.** With manual cold junction compensation. **Requires but does not include a chromel-alumel thermocouple.** Each **£27. 0. 0.** *m*

ACCESSORIES FOR PX-040, PX-045 and PX-050

PX-052 **Thermocouple, chromel-alumel, furnace mounting pattern, for 23 cm immersion.** With mounting flange, 10 mm outside diameter porcelain sheath and 185 cm of flexible compensating cable with spade ends. Each **£3. 8. 0.** *m*

PX-054 **Thermocouple, chromel-alumel, blade pattern,** with 46 cm handle and 185 cm of flexible compensating cable with spade ends ... ... Each **£6. 5. 0.** *m*

PX-055 **Thermocouple, chromel-alumel, needle pattern,** with pistol grip and 185 cm of flexible compensating cable with spade ends ... ... Each **£8. 10. 0.** *m*

PX-057 **Rotary switch, 3-way,** wall mounting, double pole with self cleaning contacts, mounted in dustproof case. Each **£9. 15. 0.** *m*

PX-059 **Compensating cable,** flexible, for chromel-alumel thermocouples. Colour coded to BS 1843. Yard **£0. 10. 6.** c

All items on this page normally available from stock.

PYROMETER INDICATORS

MAXIMUM TEMPERATURE 1600°C

PX-075

PYROMETER, flush mounting, 7 cm rectangular scale, range **0–1600°C. Requires but does not include a platinum–13% rhodium platinum thermocouple.**
Each **£8. 0. 0.** *m*

ACCESSORY

PX-042 **Bench stand.** For details and price see entry in List No. sequence.

500
1000
°C
Gallenkamp

PX-075

PX-085

PYROMETER, bracket mounting, 10 cm scale, range **0–1600°C. Requires but does not include a platinum–13% rhodium platinum thermocouple.**
Each **£16. 0. 0.** *m*

PX-095

PYROMETER, portable, 20 cm scale, range **0–1600°C. Requires but does not include a platinum–13% rhodium platinum thermocouple.** Each **£27. 0. 0.** *m*

For illustration see opposite page.

ACCESSORIES FOR PX-075, PX-085 and PX-095

PX-096	**Thermocouple, platinum–13% rhodium platinum, furnace mounting pattern,** for 23 cm immersion. With mounting flange, aluminous porcelain sheath 10 mm outside diameter and 185 cm of flexible compensating cable with spade ends	Each **£13. 5. 0.**	*m*
PX-097	**Thermocouple, platinum–13% rhodium platinum, portable pattern,** 30 cm long, with aluminous porcelain sheath 10 mm outside diameter, ebonite handle and 185 cm of flexible compensating cable with spade ends.	Each **£13. 10. 0.**	*m*
PX-099	**Compensating cable,** flexible, for platinum–13% rhodium platinum thermocouples. Colour coded to BS 1843	Yard **£0. 3. 6.**	*c*
PX-057	**Rotary switch, 3-way.** For details and price see entry in List No. sequence.		

PX-045
PX-085

PYROMETER CONTROLLER

Suitable for use with laboratory furnaces, being sensitive, accurate and compact. All instruments have high resistance double pivotted movements mounted between spring loaded sapphires, anti-parallax mirrors for the 20 cm scale, automatic cold junction compensation and thermocouple break protection. Red and green signal lamps are fitted to show the state of control. The plug-in amplifier unit is easily removable for installation and maintenance. An integral relay will handle up to 5A non-inductive loads.

The control system ensures consistent accurate operation to within ±0·25% of full scale deflection without any mechanical interference or stress on the indicating system. All controllers are suitable for 110, 210 and 240V 40 to 60 Hz single phase supplies.

PX-155

PX-150

ELECTRONIC PYROMETER ON/OFF CONTROLLER, bracket mounting, as specification with 20 cm scale, range **0–1200°C.** Requires but does not include a chromel-alumel thermocouple.
Each **£48. 17. 0.** *m*

ACCESSORIES

PX-052	**Thermocouple, chromel-alumel**	For details and prices see entries in List No. sequence.
PX-059	**Compensating cable** ...	

PX-155

ELECTRONIC PYROMETER ON/OFF CONTROLLER, bracket mounting, as specification with 20 cm scale, range **0–1600°C.** Requires but does not include a platinum–13% rhodium platinum thermocouple.
Each **£48. 17 .0.** *m*

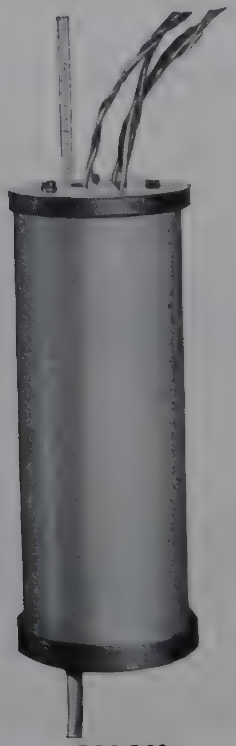
ACCESSORIES

PX-096	**Thermocouple, platinum–13% rhodium platinum** ...	For details and prices see entries in List No. sequence.
PX-099	**Compensating cable** ...	

TEMPERATURE CONTROL WITH HIGH POWER LOADS

PX-150 or PX-155 may be used in conjunction with the *Gallenkamp* **ELECTRONIC RELAY, EC-780** to switch up to 20A in each of two independent 240V a.c. non inductive circuits. For full details of EC-780 see page 218.

All items on this page normally available from stock.



PX-360

PX-375

PX-390

PX-360

COLD JUNCTION, AUTOMATIC, electrically heated, to operate at a constant fixed temperature in the range 42 to 48°C with a temperature fluctuation less than 0·2°C. Its use eliminates the inconvenience and trouble associated with maintaining a melting ice bath. The cylindrical aluminium body has a 19 mm hole drilled through its centre to accommodate thermocouple cold junctions. The body is wound with a heating element and accurate temperature control is obtained with a proportioning thermostat. The body is enclosed in a plastics cylinder to provide electrical and thermal insulation and the assembly is dustproof. Overall dimensions 7·5 cm diameter × 21 cm long. For 200/250V a.c. or d.c. supplies
Each **£10. 6. 0.** *fS*

THERMOCOUPLE TEST SET

Suitable for:

(a) Checking and calibration of thermocouples by comparison with a standard thermocouple.

(b) Measurement of thermocouple, lead resistance etc. (the reversing switch enables correction to be made for any inherent e.m.f. in the circuit and avoids the need for reversing leads.

(c) Calibration of indicators, recorders and controllers under correct conditions of external circuit resistance.

SPECIFICATION

Potentiometer ranges	0–20 mV and 1–100 mV
Potentiometer accuracy	about ±0·1%
Bridge accuracy	about ±0·1%
Potential source ranges	20 mV, 50 mV and 100 mV

PX-375

THERMOCOUPLE TEST SET, *Pye,* as specification, comprises d.c. potentiometer, Wheatstone bridge, potential source with variable resistance load, taut suspension pointer galvanometer, two 1·5V batteries and instructions manual in carrying case.
Each **£140. 0. 0.** *f*

DISAPPEARING FILAMENT PYROMETER

A simple, practical and convenient optical pyrometer, suitable for laboratory and industrial use. The instrument is light in weight and portable and the complete outfit, including the nickel-iron accumulator, can be contained in a leather carrying case, available as an accessory.

The pyrometer consists essentially of an electric lamp in circuit with a small ammeter and rheostat. By adjusting the rheostat, the current passing through the lamp can be varied and the brightness of the lamp filament adjusted to match that of the hot body whose temperature is to be measured. The lamp is contained within a short telescope, on which the ammeter is mounted with its scale facing the observer. The matching of the filament is simply and accurately obtained by viewing it against a background formed by the hot body and adjusting the rheostat until the tip of the filament cannot be distinguished from the background. The reading of the ammeter scale, which is calibrated in °C, then indicates the temperature.

PX-390

PYROMETER, DISAPPEARING FILAMENT, *Cambridge,* range 700 to 1400°C or 900 to 1600°C, **without carrying case** ... ... Each **£56. 0. 0.** *f*

When ordering please state range required.

PX-392

PYROMETER, as PX-390, but for double range 700 to 1300°C and 1000 to 1800°C, **without carrying case.**
Each **£62. 5. 0.** *f*

ACCESSORY

PX-394 Leather carrying case ... ... Each £9. 0. 0. *fS*

Items on this page coded S normally available from stock.

QUICKFIT AND *CLEARFIT* STANDARD JOINT APPARATUS

The properties of *Quickfit* ground glass joints are too well known to require introduction.

The recently introduced *Clearfit* conical glass joints are manufactured by a new process which achieves a fine precision fit without the necessity of grinding. This provides the following advantages:

- **Greater strength**
- **Reduced leakage and creep**
- **Less contamination, easier cleaning**
- **Greasing rarely necessary**
- **Reduced seizing or sticking**
- **Reduced alkali attack**
- **Transparent for internal observation**
- **Interchangeable with ground joints**

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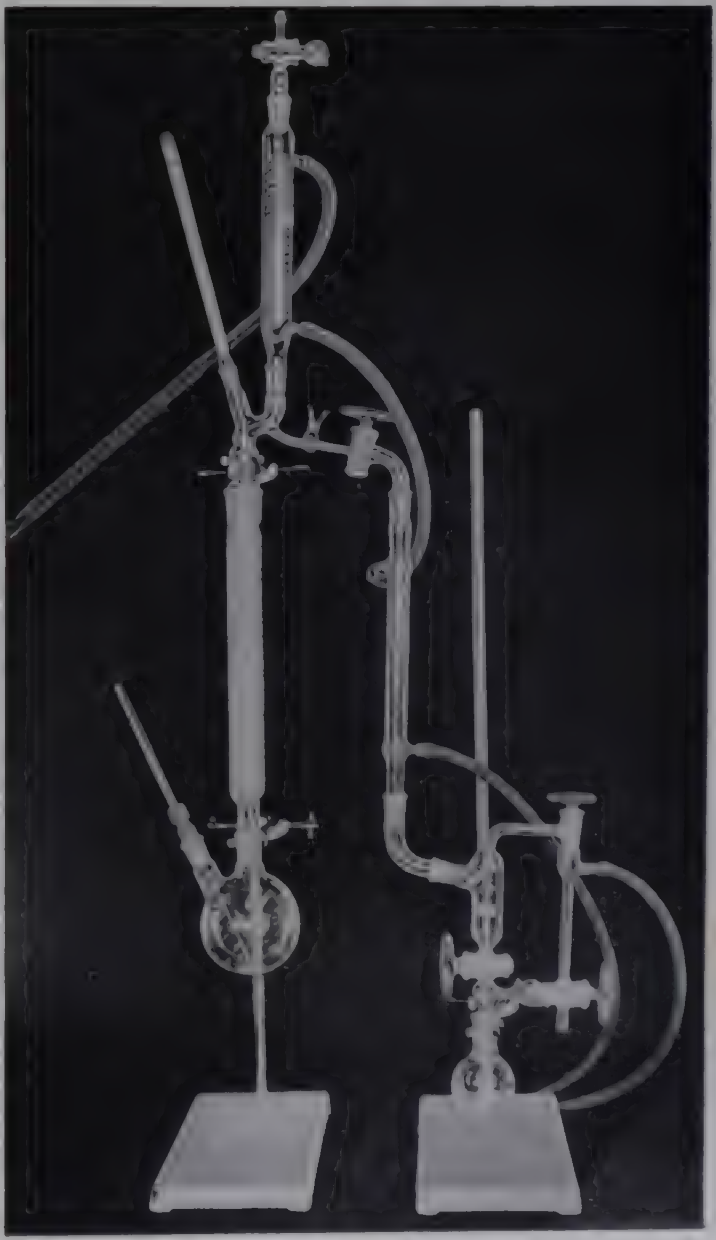
The following pages present the current range of *Quickfit* and *Clearfit* general equipment, including large and small scale apparatus. A summary of the contents of the section, which has a broadly alphabetical arrangement will be found on the next page. A guide to other *Quickfit* apparatus included in this catalogue appears at the foot of this page.

We continue to manufacture many AG speciality items of standard joint glassware, particularly those incorporating fritted filters or volumetric calibrations. Most of these items are complementary to the *Quickfit* range and can be used interchangeably with them.

Laboratories can now obtain, from one source, the products of the two leading manufacturers whose combined experience in this field is unique.

Further useful information relating to *Quickfit* and AG products will be found under the title STANDARD JOINT APPARATUS.

Details of order value discounts will be found under 'Conditions of Sale' at the beginning of the catalogue.



QUICKFIT AND CLEARFIT APPARATUS

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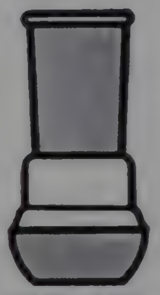
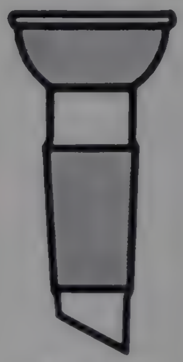
ADAPTERS

CONICAL-SPHERICAL ADAPTERS

These adapters used as a pair at a critical point provide a ready means of introducing flexibility into a conical jointed assembly.

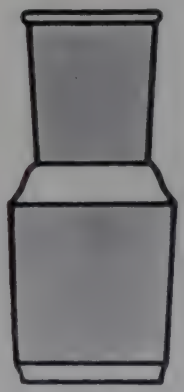
List No.	Socket	Cone	Ball/Cup	Clip Ref. JR-260	Six	Each
Quickfit						
Q-SB 1/29	14/23	—	S 29	JC 29	85/–	15/9
Q-SB 2/29	19/26	—	S 29	JC 29	92/–	17/–
Q-SB 3/35	24/29	—	S 35	JC 35	102/6	19/–
Q-SB 5/51	34/35	—	S 51	JC 51	135/–	25/–
Q-CC 1/29	—	14/23	S 29	JC 29	97/–	18/–
Q-CC 2/29	—	19/26	S 29	JC 29	94/6	17/6
Q-CC 3/35	—	24/29	S 35	JC 35	96/–	17/9
Q-CC 5/51	—	34/35	S 51	JC 51	133/6	24/9

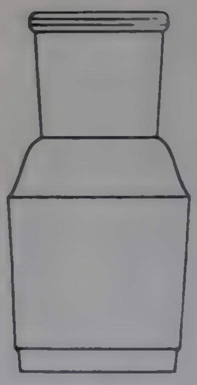

Q-SB 3/35


Q-CC 3/35

REDUCTION ADAPTERS

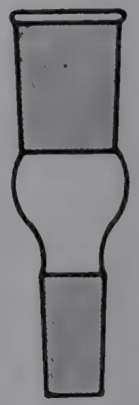
List No.	Socket	Cone	Dozen	Each
Quickfit				
Q-DA 01	10/19	14/23	89/–	8/6
Q-DA 12	14/23	19/26	81/–	7/10
Q-DA 13	14/23	24/29	86/–	8/3
Q-DA 14	14/23	29/32	89/–	8/6
Q-DA 23	19/26	24/29	85/–	8/3
Q-DA 24	19/26	29/32	92/–	8/9
Q-DA 25	19/26	34/35	97/–	9/–
			Six	Each
Q-DA 26	19/26	40/38	70/–	13/–
Q-DA 27	19/26	45/40	75/6	14/–
Q-DA 29	19/26	55/44	86/6	16/–
Q-DA 34	24/29	29/32	47/–	8/9
Q-DA 35	24/29	34/35	48/6	9/–
Q-DA 36	24/29	40/38	73/–	13/6
Q-DA 37	24/29	45/40	75/6	14/–
Q-DA 38	24/29	50/42	83/6	15/6
Q-DA 39	24/29	55/44	92/–	17/–
Q-DA 45	29/32	34/35	56/6	10/6
Q-DA 56	34/35	40/38	75/6	14/–
Q-DA 57	34/35	45/40	83/6	15/6
Q-DA 58	34/35	50/42	89/–	16/6
Q-DA 59	34/35	55/44	106/6	19/9
Clearfit				
Q-KDA 12	14/23	19/26	75/6	14/–
Q-KDA 13	14/23	24/29	82/6	15/3
Q-KDA 14	14/23	29/32	86/6	16/–
Q-KDA 23	19/26	24/29	85/–	15/9
Q-KDA 24	19/26	29/32	87/6	16/3
Q-KDA 34	24/29	29/32	90/6	16/9


Q-DA 24

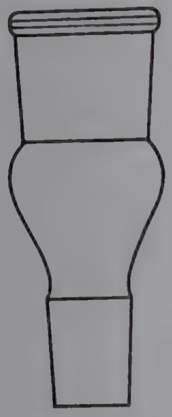

Q-KDA 24

All items on this page normally available from stock (code *m*).

ADAPTERS



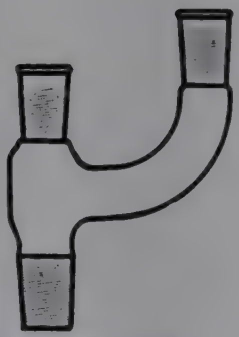
Q-XA 31



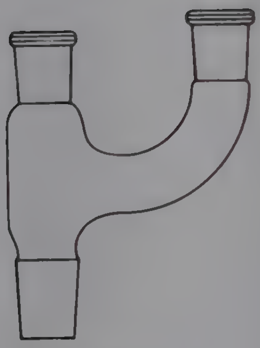
Q-KXA 42

EXPANSION ADAPTERS

List No.	Socket	Cone	Six	Each
Quickfit				
Q-XA 10	14/23	10/19	65/–	12/–
Q-XA 21	19/26	14/23	47/–	8/9
Q-XA 31	24/29	14/23	51/6	9/6
Q-XA 32	24/29	19/26	55/6	10/3
Q-XA 41	29/32	14/23	71/6	13/3
Q-XA 42	29/32	19/26	73/–	13/6
Q-XA 43	29/32	24/29	69/–	12/9
Q-XA 52	34/35	19/26	73/–	13/6
Q-XA 53	34/35	24/29	70/–	13/–
Q-XA 54	34/35	29/32	70/–	13/–
Clearfit				
Q-KXA 21	19/26	14/23	78/6	14/6
Q-KXA 31	24/29	14/23	83/6	15/6
Q-KXA 32	24/29	19/26	89/–	16/6
Q-KXA 41	29/32	14/23	97/–	18/–
Q-KXA 42	29/32	19/26	101/6	18/9
Q-KXA 43	29/32	24/29	100/–	18/6



Q-MA 1/3

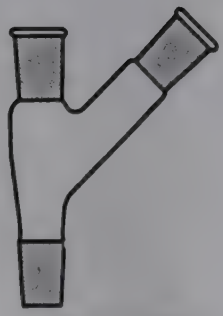


Q-KMA 1/3

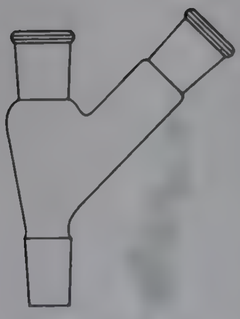
MULTIPLE ADAPTERS

With two necks parallel

List No.	Sockets	Cone	Six	Each
Quickfit				
Q-MA 1/00	10/19	10/13	108/–	20/–
Q-MA 1/11	14/23	14/23	110/6	20/6
Q-MA 1/2	19/26	19/26	104/–	19/6
Q-MA 1/3	19/26	24/29	104/–	19/6
Q-MA 1/33	24/29	24/29	137/6	25/6
Q-MA 1/5	19/26	34/35	110/6	20/6
Clearfit				
Q-KMA 1/2	19/26	19/26	140/6	26/–
Q-KMA 1/3	19/26	24/29	129/6	24/–
Q-KMA 1/33	24/29	24/29	175/6	32/6
Q-KMA 1/44	29/32	29/32	186/6	34/6



Q-MA 2/2



Q-KMA 2/33

With two necks at 45°

List No.	Sockets	Cone	Six	Each
Quickfit				
Q-MA 2/2	19/26	19/26	113/6	21/–
Q-MA 2/3	19/26	24/29	113/6	21/–
Clearfit				
Q-KMA 2/33	24/29	24/29	156/6	29/–

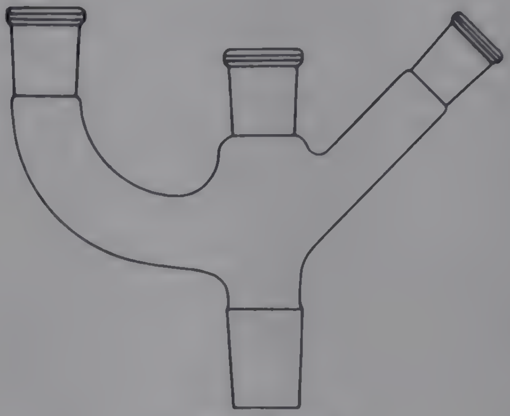
All items on this page normally available from stock (code *m*).

ADAPTERS

MULTIPLE ADAPTERS

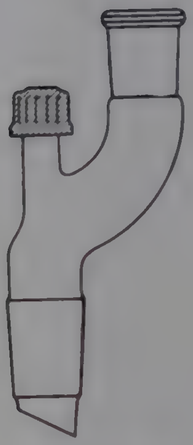
With three necks, two parallel, one at 45°

List No.	Sockets		Cone	Six	Each
	Parallel necks	Angled neck			
Quickfit					
Q-MA 4/13	19/26	14/23	24/29	167/6	31/-
Q-MA 4/23	19/26	19/26	24/29	159/6	29/6
Q-MA 4/25	19/26	19/26	34/35	166/-	30/9
Clearfit					
Q-KMA 4/13	19/26	14/23	24/29	213/-	39/6
Q-KMA 4/23	19/26	19/26	24/29	200/-	37/-
Q-KMA 4/3	24/29	24/29	24/29	216/-	40/-
Q-KMA 4/1411	14/23	14/23	29/32	210/6	39/-


Q-KMA 4/23

Swan neck adapters
For use with thermometer or air leak tube

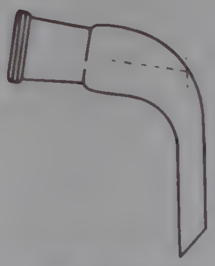
List No.	Socket	Cone	Thread	Six	Each
Quickfit					
Q-MA 6/11	14/23	14/23	13	104/-	19/3
Q-MA 6/22	19/26	19/26	13	104/-	19/3
Q-MA 6/23	19/26	24/29	13	104/-	19/3
Q-MA 6/33	24/29	24/29	13	124/-	23/-
Clearfit					
Q-KMA 6/33	24/29	24/29	13	129/6	24/-

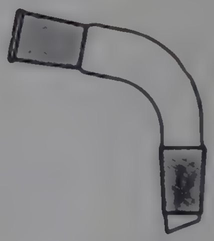

Q-KMA 6/33

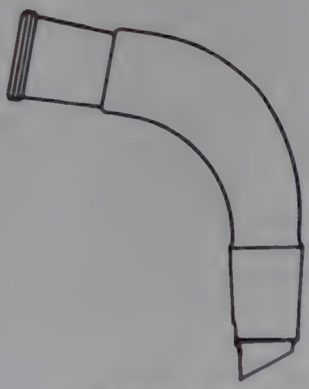
RECEIVER ADAPTERS

Plain bends, short

List No.	Socket	Cone	Dozen	Each
Quickfit				
Q-RA 1/01	14/23	—	100/-	9/3
Q-RA 1/02	19/26	—	105/-	9/9
Q-RA 1/03	24/29	—	111/-	10/3
			Six	Each
Q-RA 9/22	19/26	19/26	71/6	13/3
Q-RA 9/23	19/26	24/29	66/-	12/3
Q-RA 9/33	24/29	24/29	83/6	15/6
Q-RA 9/55	34/35	34/35	132/6	24/6
Clearfit				
Q-KRA 1/02	19/26	—	56/6	10/6
Q-KRA 1/03	24/29	—	62/-	11/6
Q-KRA 9/22	19/26	19/26	102/6	19/-
Q-KRA 9/33	24/29	24/29	119/6	21/-


Q-KRA 1/03


Q-RA 9/22


Q-KRA 9/33

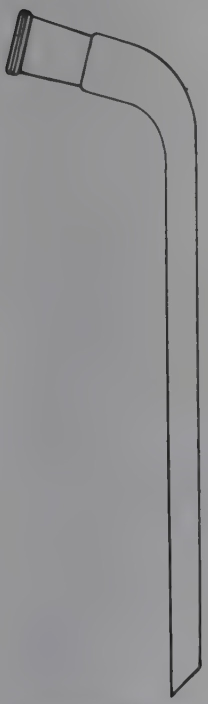
All items on this page normally available from stock (code *m*).

ADAPTERS

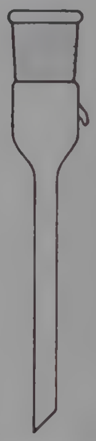
RECEIVER ADAPTERS

Plain bends, long

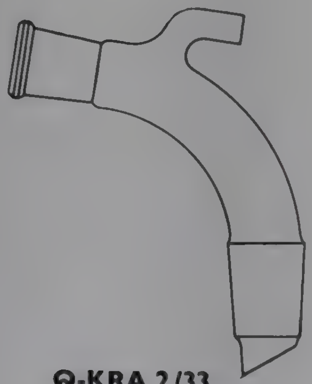
List No.	Socket	Dozen	Each
Quickfit			
Q-RA 1/10	10/19	103/–	9/6
Q-RA 1/11	14/23	111/–	10/3
Q-RA 1/12	19/26	116/–	10/9
Q-RA 1/13	24/29	121/–	11/3
Q-RA 1/14	29/32	138/–	12/9
Clearfit		Six	Each
Q-KRA 1/11	14/23	59/6	11/–
Q-KRA 1/12	19/26	62/–	11/6
Q-KRA 1/13	24/29	70/–	13/–
Q-KRA 1/14	29/32	75/6	14/–



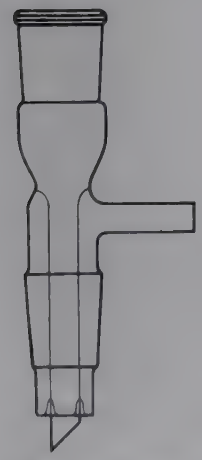
Q-KRA 1/12



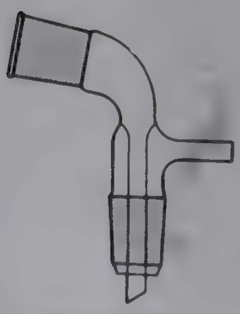
Q-RA 1/22



Q-KRA 2/33



Q-KRA 13/33



Q-RA 3/22

Straight delivery adapters

List No.	Socket	Dozen	Each
Quickfit			
Q-RA 1/21	14/23	92/-	8/9
Q-RA 1/22	19/26	97/-	9/–
Q-RA 1/23	24/29	105/–	9/9
		Six	Each
Q-RA 1/25	34/35	69/–	12/9

Bends with vent

List No.	Socket	Cone	Six	Each
Quickfit				
Q-RA 2/00	10/19	10/13	75/6	14/–
Q-RA 2/11	14/23	14/23	73/–	13/6
Q-RA 2/22	19/26	19/26	83/–	15/4
Q-RA 2/23	19/26	24/29	75/6	14/–
Q-RA 2/33	24/29	24/29	86/6	16/–
Clearfit				
Q-KRA 2/11	14/23	14/23	94/6	17/6
Q-KRA 2/22	19/26	19/26	108/–	20/–
Q-KRA 2/33	24/29	24/29	130/–	23/–

Vacuum type, bent

List No.	Socket	Cone	Six	Each
Quickfit				
Q-RA 3/11	14/23	14/23	121/6	22/6
Q-RA 3/22	19/26	19/26	127/–	23/6
Q-RA 3/23	19/26	24/29	129/6	24/–
Q-RA 3/33	24/29	24/29	129/6	24/–
Q-RA 3/44	29/32	29/32	148/6	27/6
Clearfit				
Q-KRA 3/11	14/23	14/23	132/6	24/6
Q-KRA 3/22	19/26	19/26	143/–	26/6
Q-KRA 3/33	24/29	24/29	154/–	28/6
Q-KRA 3/44	29/32	29/32	173/–	32/–

Vacuum type, straight

List No.	Socket	Cone	Six	Each
Quickfit				
Q-RA 13/33	24/29	24/29	121/6	22/6
Clearfit				
Q-KRA 13/33	24/29	24/29	129/6	24/–

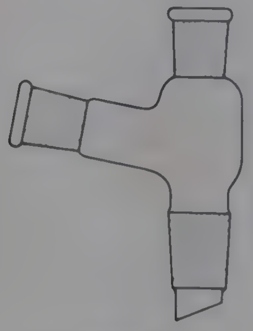
All items on this page normally available from stock (code *m*).

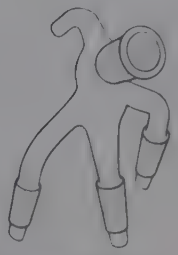
ADAPTERS

RECEIVER ADAPTERS

Bends with socket connection

List No.	Sockets	Cone	Six	Each
Quickfit				
Q-RA 4/11	14/23	14/23	**108/–**	**20/–**
Q-RA 4/22	19/26	19/26	**113/6**	**21/–**
Q-RA 4/23	19/26	24/29	**119/–**	**22/–**


Q-RA 4/23

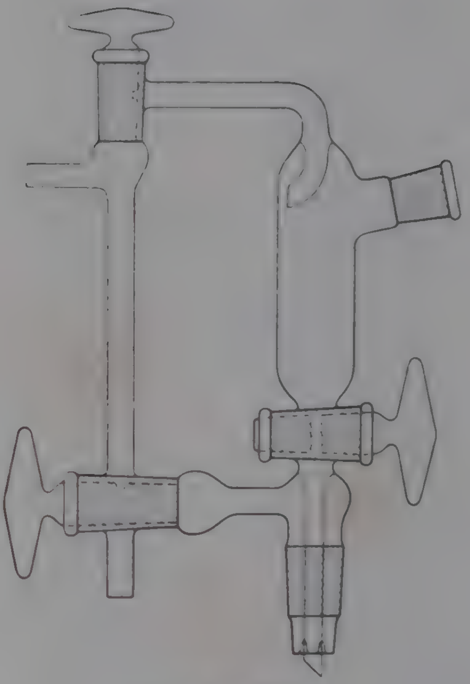

Q-RA 5/21

Bends with multiple connections (pig)

List No.	Socket	Cones	Six	Each
Quickfit				
Q-RA 5/00	10/19	10/13	**167/6**	**31/–**
Q-RA 5/11	14/23	14/23	**243/–**	**45/–**
Q-RA 5/21	19/26	14/23	**248/6**	**46/–**

Perkin intermediate receivers

List No.	Socket	Cone	Six	Each
Quickfit				
Q-RA 6/11	14/23	14/23	**1080/–**	**200/–**
Q-RA 6/23	19/26	24/29	**1134/–**	**210/–**

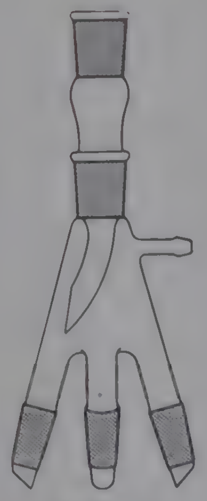

Q-RA 6/23

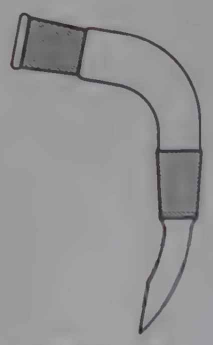
Adapters, socket to cone, with T-connection

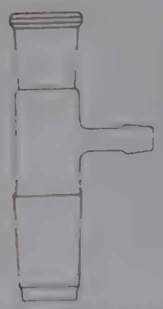
List No.	Socket	Cone	Six	Each
Quickfit				
Q-MF 17/1	14/23	14/23	**65/–**	**12/–**
Q-MF 17/3	14/23	24/29	**67/6**	**12/6**
Q-MF 18/2	19/26	19/26	**78/6**	**14/6**
Q-MF 18/3	19/26	24/29	**63/6**	**11/9**
Q-MF 18/5	19/26	34/35	**73/–**	**13/6**
Q-MF 18/33	24/29	24/29	**81/–**	**15/–**
Clearfit				
Q-KMF 17/1	14/23	14/23	**94/6**	**17/6**
Q-KMF 18/2	19/26	19/26	**94/6**	**17/6**
Q-KMF 18/33	24/29	24/29	**108/–**	**20/–**

Vacuum type, with multiple connections

List No.	Description	Socket	Cone	Six	Each
Quickfit					
Q-RA 11	Vacuum receiver adapter, with 14/23 cones to take 4×100 ml receiver flasks	19/26	14/23	**259/–**	**48/–**
Q-RA 11/2	Adapter for vertical delivery	19/26	19/26	**73/–**	**13/6**
Q-RA 12/2	Adapter for sloping delivery	19/26	19/26	**102/6**	**19/–**


Q-RA 11
Q-RA 11/2


Q-RA 12/2

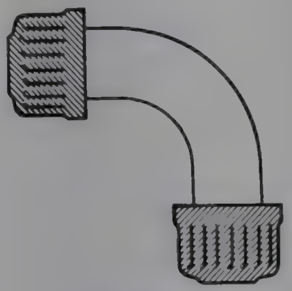

Q-KMF 17/3
Q-KMF 18/2

All items on this page normally available from stock (code *m*).

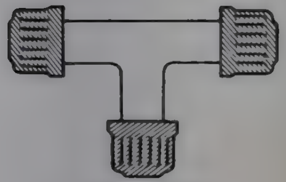
ADAPTERS

SCREW THREAD CONNECTORS

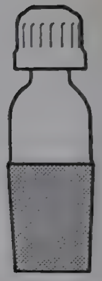
A range of connectors providing flexibility in assemblies where adjustable multiple connections are required. They are quick and easy to assemble and dismantle and when used in conjunction with standard glassware enable complicated assemblies to be constructed without the aid of a glassblower.



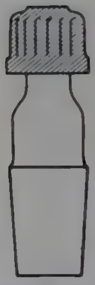
Q-SQ 3/18



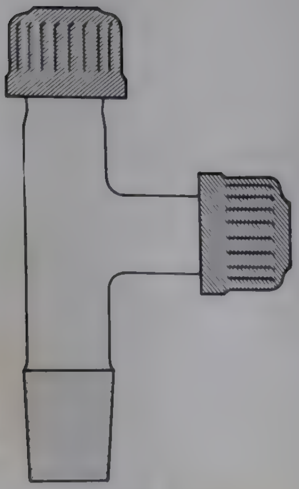
Q-SQ 1/13



Q-ST 53/13



Q-KST 53/13



Q-MQ 1/3C

Connectors 90° bend

List No.	Thread	Approx. length of limbs	Six	Each
Quickfit				
Q-SQ 3/13	13	35 mm	**65/–**	**12/–**
Q-SQ 3/18	18	45 mm	**83/6**	**15/6**

Connectors T-shape

List No.	Thread	Approx. length of limbs	Six	Each
Quickfit				
Q-SQ 1/13	13	35 mm	**105/6**	**19/6**
Q-SQ 1/18	18	40 mm	**135/–**	**25/–**

Cone and screw cap adapters

For fitting inlet tubes, thermometers, sampling tubes, stirrer glands or air leak tubes into standard joint sockets. The adapters have standard screw threads to BS 1918 into which a tube or thermometer 6–19 mm dia. can be fitted by means of a screw down cap, silicone rubber compression ring and PTFE washer.

List No.	Thread	Cone	Dia. through Screw Cap	Six	Each
Quickfit					
Q-ST 51/13	13	14/23	6 – 7 mm	**70/–**	**13/–**
Q-ST 52/13	13	19/26	6 – 7 mm	**73/–**	**13/6**
Q-ST 53/13	13	24/29	6 – 7 mm	**75/6**	**14/–**
Q-ST 51/18	18	14/23	7 – 8·5 mm	**74/–**	**13/9**
Q-ST 52/18	18	19/26	7 – 8·5 mm	**77/–**	**14/3**
Q-ST 53/18	18	24/29	7 – 8·5 mm	**81/–**	**15/–**
Q-ST 52/24	24	19/26	10·5–11·5 mm	**87/6**	**16/3**
Q-ST 53/24	24	24/29	10·5–11·5 mm	**92/–**	**17/–**
Q-ST 55/24	24	34/35	10·5–11·5 mm	**102/6**	**19/–**
Q-ST 55/28	28	34/35	18–19 mm	**102/6**	**19/–**
Clearfit					
Q-KST 51/13	13	14/23	6 – 7 mm	**73/–**	**13/6**
Q-KST 52/13	13	19/26	6 – 7 mm	**77/–**	**14/3**
Q-KST 53/13	13	24/29	6 – 7 mm	**81/–**	**15/–**
Q-KST 54/13	13	29/32	6 – 7 mm	**83/6**	**15/6**
Q-KST 51/18	18	14/23	7 – 8·5 mm	**77/–**	**14/3**
Q-KST 52/18	18	19/26	7 – 8·5 mm	**81/–**	**15/–**
Q-KST 53/18	18	24/29	7 – 8·5 mm	**83/6**	**15/6**
Q-KST 54/18	18	29/32	7 – 8·5 mm	**86/6**	**16/–**
Q-KST 52/24	24	19/26	10 –11·5 mm	**94/6**	**17/6**
Q-KST 53/24	24	24/29	10 –11·5 mm	**97/–**	**18/–**
Q-KST 54/24	24	29/32	10 –11·5 mm	**98/6**	**18/3**

Adapters cone and screw threads, one vertical and one at 90°

List No.	Thread	Cone	Dia. through Screw Cap	Six	Each
Quickfit					
Q-MQ 1/1A	13	14/23	6 – 7 mm	**100/–**	**18/6**
Q-MQ 1/2A	13	19/26	6 – 7 mm	**102/6**	**19/–**
Q-MQ 1/3C	24	24/29	10·5–11·5 mm	**143/–**	**26/6**

All items on this page normally available from stock (code *m*).

ADAPTERS

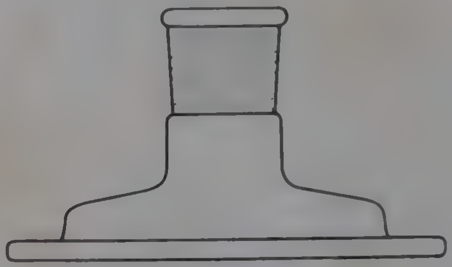
FLAT FLANGE ADAPTERS

The flange sizes given below represent the internal diameters in mm within the flanges.

The lid with 50 mm flat flange is for use with the 100 ml reaction vessels listed on page 663. It is particularly useful for the complete evaporation of solutions to leave a solid which can then easily be recovered quantitatively from this type of vessel. The 75 mm flat flange lids, when used with the 250 ml or 500 ml reaction vessels listed on page 663, facilitate operation with resinous materials in the 100 g range, and is generally useful for preparative chemical work.

All the 100 mm multi-socket/flat flange lids have a centre socket designed for use with a stirrer, a parallel side neck to take a thermometer or thermometer pocket and a side neck at an angle of 10° to the vertical to take a cylindrical dropping funnel up to 500 ml capacity. The remaining necks will accommodate condenser, stillhead, gas inlet, sampling tubes, stoppers, etc.

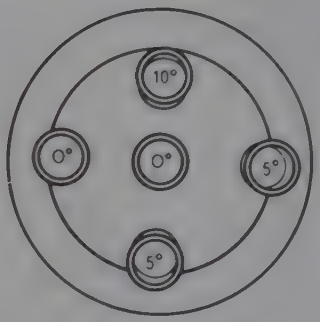
A multiple adapter such as MA 2/2 can be fitted into the parallel side neck in order to provide offset clearance for a large dropping funnel.



Q-DA 5/100

Socket/flat flange

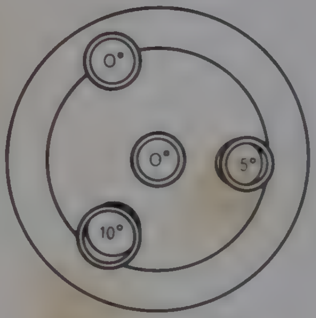
List No.	Flat flange	Socket	Six	Each
Quickfit				
Q-DA 5/75	75	34/35	**232/–**	**43/–**
Q-DA 5/100	100	34/35	**216/–**	**40/–**



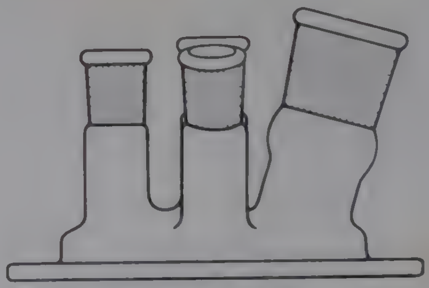
Q-MAF 2/2

Multi socket/flat flange

List No.	Flat flange	Centre neck	Side necks	Six	Each
Quickfit					
Q-MAF 0/50	50	10/19	4×10/19	**380/6**	**70/6**
Q-MAF 1/75	75	19/26	3×19/26 1×14/23	**380/6**	**70/6**
Q-MAF 2/2	100	19/26	4×19/26	**380/6**	**70/6**
Q-MAF 2/32	100	19/26	2×19/26 1×24/29	**345/6**	**64/–**
Q-MAF 2/52	100	19/26	3×19/26 1×34/35	**426/6**	**79/–**
Q-MAF 3/52	100	24/29	3×19/26 1×34/35	**448/–**	**83/–**



Q-MAF 2/32

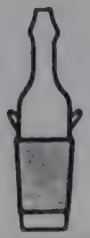


Q-MAF 2/52

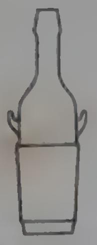
TUBING ADAPTERS

Cone to rubber tubing, straight connection

List No.	Cone	Six	Each
Quickfit			
Q-MF 10/1	14/23	**46/–**	**8/6**
Q-MF 10/2	19/26	**52/6**	**9/9**
Q-MF 10/3	24/29	**58/–**	**10/9**
Clearfit			
Q-KMF 10/1	14/23	**56/6**	**10/6**
Q-KMF 10/2	19/26	**65/–**	**12/–**
Q-KMF 10/3	24/29	**73/–**	**13/6**



Q-MF 10/2



Q-KMF 10/2

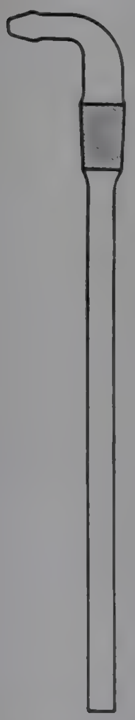
All items on this page normally available from stock (code *m*).

ADAPTERS

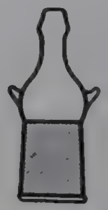
TUBING ADAPTERS

Cone to rubber tubing, right angle connection.

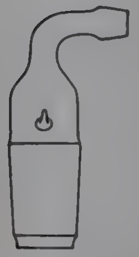
List No.	Cone	Six	Each
Quickfit			
Q-MF 10/1B	14/23	**51/6**	**9/6**
Q-MF 10/2B	19/26	**55/6**	**10/3**
Q-MF 10/3B	24/29	**62/–**	**11/6**
Q-MF 10/5B	34/35	**70/–**	**13/–**
Clearfit			
Q-KMF 10/2B	19/26	**67/6**	**12/6**
Q-KMF 10/3B	24/29	**75/6**	**14/–**
Q-KMF 10/4B	29/32	**79/6**	**14/9**



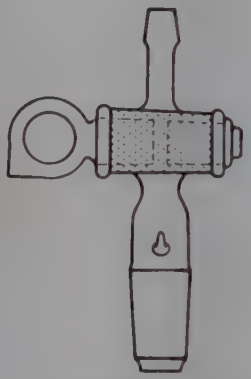
Q-MF 15/2B



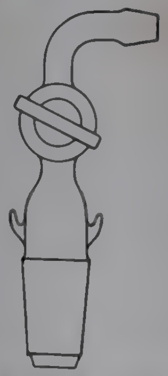
Q-MF 13/3



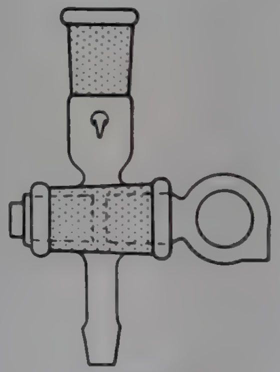
Q-KMF 10/3B



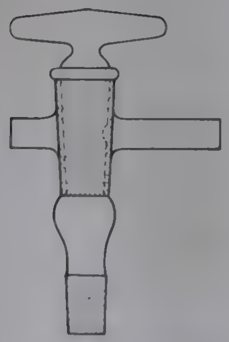
Q-KMF 11/3



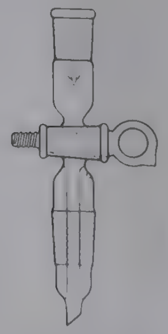
Q-KMF 11/3B



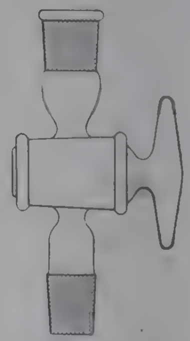
Q-MF 14/2



Q-SC 4/3/2



Q-CR 3T/23



Q-EF 6T/33

Cone with stem to rubber tubing, right angle connection.

List No.	Socket	Dozen	Each
Quickfit			
Q-MF 15/1B	14/23	**119/–**	**11/–**
Q-MF 15/2B	19/26	**132/–**	**12/3**
Q-MF 15/3B	24/29	**146/–**	**13/6**

Socket to rubber tubing, straight connection.

List No.	Cone	Dozen	Each
Quickfit			
Q-MF 13/2	19/26	**116/–**	**10/9**
Q-MF 13/3	24/29	**116/–**	**10/9**

STOPCOCK ADAPTERS

Cone to rubber tubing, with interchangeable stopcock, straight connection.

List No.	Cone	Six	Each
Quickfit			
Q-MF 11/1	14/23	**156/6**	**29/–**
Q-MF 11/2	19/26	**162/–**	**30/–**
Q-MF 11/3	24/29	**167/6**	**31/–**
Clearfit			
Q-KMF 11/3	24/29	**167/6**	**31/–**

Cone to rubber tubing, with interchangeable stopcock, right angle connection.

List No.	Cone	Six	Each
Quickfit			
Q-MF 11/1B	14/23	**162/–**	**30/–**
Q-MF 11/2B	19/26	**167/6**	**31/–**
Q-MF 11/3B	24/29	**173/–**	**32/–**
Q-MF 11/5B	34/35	**183/6**	**34/–**
Clearfit			
Q-KMF 11/3B	24/29	**173/–**	**32/–**

Socket to rubber tubing, with interchangeable stopcock.

List No.	Socket	Dozen	Each
Quickfit			
Q-MF 14/1	14/23	**324/–**	**30/–**
Q-MF 14/2	19/26	**329/–**	**30/6**
Q-MF 14/2B	19/26	**346/–**	**32/–**
Q-MF 14/3	24/29	**346/–**	**32/–**

Q-D 5/4 STOPCOCK KEYS, interchangeable. } For prices see page 662.
Q-D 5/4R PLASTICS RETAINING RINGS. }

Vacuum stopcock.

List No.	Socket	Cone	Six	Each
Quickfit				
Q-SC 3/3/2	—	19/26	**310/6**	**57/6**
Q-SC 4/3/2	—	19/26	**351/–**	**65/–**
Q-CR 3T/23	19/26	24/29	**397/–**	**73/6**
Q-EF 6T/33	24/29	24/29	**410/6**	**76/–**
Q-EF 6T/55	34/35	34/35	**464/6**	**86/–**

All items on this page normally available from stock (code *m*).

CONDENSERS

AIR CONDENSERS

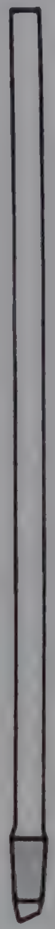
List No.	Effective length mm	Socket	Cone	Six	Each
Quickfit					
Q-C 2/00	100	10/19	10/13	**52/6**	**9/9**
Q-C 2/11	200	14/23	14/23	**47/–**	**8/9**
Q-C 2/12	150	19/26	19/26	**55/6**	**10/3**
Q-FC 7/23	300	24/29	24/29	**71/6**	**13/3**
Q-C 2/22	400	19/26	19/26	**60/6**	**11/3**
Q-FC 7/43	550	24/29	24/29	**104/–**	**19/3**
Q-C 2/32	600	19/26	19/26	**119/–**	**22/–**
Q-FC 7/53	800	24/29	24/29	**135/–**	**25/–**
Q-CX 2/11	450	—	14/23	**54/–**	**10/–**
Q-CX 2/22	750	—	19/26	**66/–**	**12/3**
Q-CX 2/23	750	—	24/29	**73/–**	**13/6**
Q-CX 2/24	750	—	29/32	**75/6**	**14/–**
Clearfit					
Q-KC 2/11	200	14/23	14/23	**73/–**	**13/6**
Q-KC 2/12	150	19/26	19/26	**83/6**	**15/6**
Q-KC 2/22	400	19/26	19/26	**86/6**	**16/–**
Q-KCX 2/23	760	—	24/29	**86/6**	**16/–**

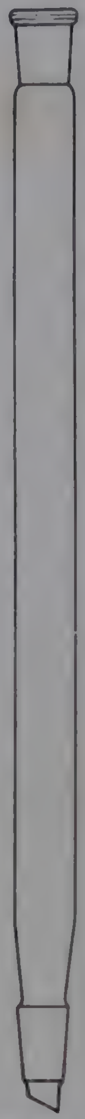
LIEBIG CONDENSERS

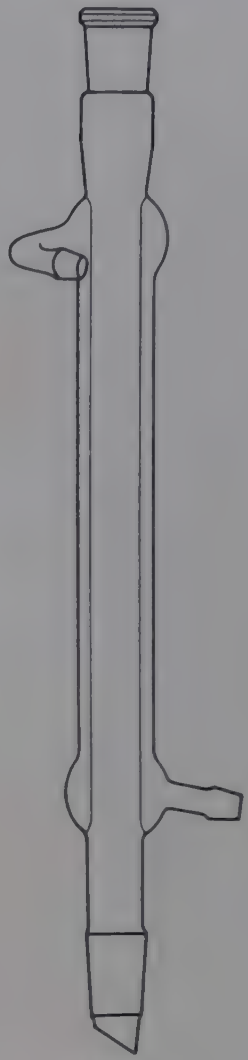
List No.	Effective length mm	Socket	Cone	Six	Each
Quickfit					
Q-C 1/00	60	10/19	10/13	**90/6**	**16/9**
Q-C 1/11	150	14/23	14/23	**116/–**	**21/6**
QC- 1/12	200	19/26	19/26	**124/–**	**23/–**
Q-C 1/13	200	24/29	24/29	**140/6**	**26/–**
Q-CX 1/2/25	250	—	19/26	**121/6**	**22/6**
Q-C 1/22	400	19/26	19/26	**135/–**	**25/–**
Q-C 1/23	400	24/29	24/29	**151/–**	**28/–**
Q-CX 1/23	350	—	24/29	**135/–**	**25/–**
Q-C 1/55	500	34/35	34/35	**556/–**	**103/–**
Clearfit					
Q-KC 1/11	150	14/23	14/23	**129/6**	**24/–**
Q-KC 1/12	200	19/26	19/26	**135/–**	**25/–**
Q-KC 1/13	200	24/29	24/29	**162/–**	**30/–**
Q-KC 1/22	400	19/26	19/26	**146/–**	**27/–**
Q-KC 1/23	400	24/29	24/29	**162/–**	**30/–**
Q-KC 1/44/30	300	29/32	29/32	**270/–**	**50/–**

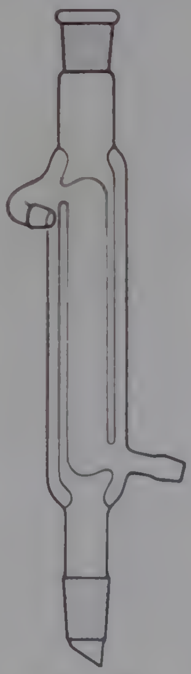
DAVIES CONDENSERS

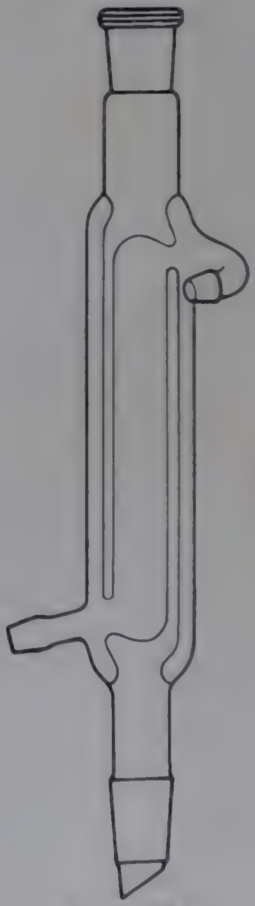
List No.	Effective length mm	Socket	Cone	Six	Each
Quickfit					
Q-C 5/00	100	10/19	10/13	**256/6**	**47/6**
Q-C 5/12	150	19/26	19/26	**227/–**	**42/–**
Q-C 5/13	150	24/29	24/29	**237/6**	**44/–**
Q-C 5/22	200	19/26	19/26	**232/–**	**43/–**
Q-C 5/23	200	24/29	24/29	**243/–**	**45/–**
Q-CX 5/23	200	—	24/29	**237/6**	**44/–**
Q-CX 5/25	200	—	34/35	**275/6**	**51/–**
Clearfit					
Q-KC 5/12	150	19/26	19/26	**254/–**	**47/–**
Q-KC 5/13	160	24/29	24/29	**264/6**	**49/–**
Q-KC 5/22	200	19/26	19/26	**259/–**	**48/–**
Q-KC 5/23	200	24/29	24/29	**270/–**	**50/–**
Q-KC 5/24	200	29/32	29/32	**289/–**	**53/6**


Q-CX 2/22


Q-KC 2/22


Q-KC 1/12

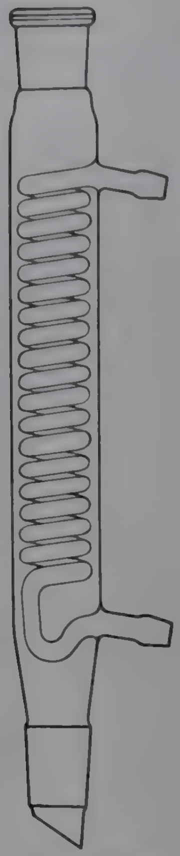

Q-C 5/12


Q-KC 5/23

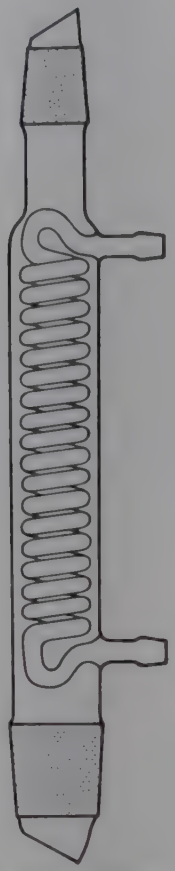
(AS) Davies condensers with standard joints see CONDENSERS.

All items on this page normally available from stock (code *m*).

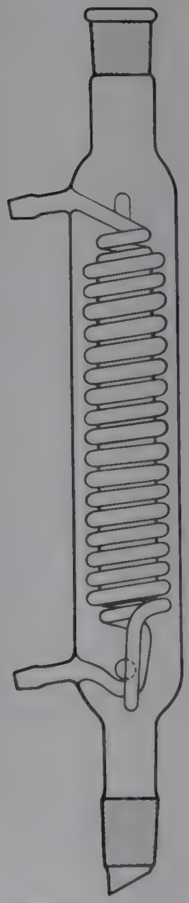
CONDENSERS



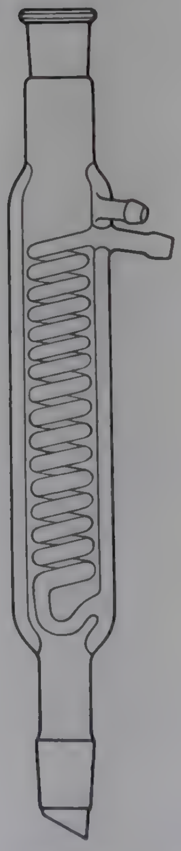
Q-KC 3/13



Q-CX 3/23



Q-C 4/12



Q-KCX 6/33

COIL OR GRAHAM CONDENSERS

List No.	Effective length mm	Socket	Cone	Six	Each
Quickfit					
Q-C 3/12	150	19/26	19/26	**191/6**	**35/6**
Q-C 3/13	150	24/29	24/29	**194/6**	**36/-**
Q-CX 3/04	150	—	29/32	**186/6**	**34/6**
Q-CX 3/05	150	—	34/35	**200/-**	**37/-**
Q-CX 3/06	200	—	40/38	**256/6**	**47/6**
Q-CX 3/07	200	—	45/40	**291/6**	**54/-**
Q-CX 3/08	200	—	50/42	**297/-**	**55/-**
Q-C 3/22	300	19/26	19/26	**313/-**	**58/-**
Q-C 3/23	300	24/29	24/29	**318/6**	**59/-**
Clearfit					
Q-KC 3/12	150	19/26	19/26	**191/6**	**35/6**
Q-KC 3/13	150	24/29	24/29	**194/6**	**36/-**
Q-KC 3/14	150	29/32	29/32	**194/6**	**36/-**
Q-KC 3/23	320	24/29	24/29	**318/6**	**59/-**

REVERSIBLE COIL CONDENSERS

List No.	Effective length mm	Cones	Six	Each
Quickfit				
Q-CX 3/23	150	19/26 and 24/29	**212/-**	**39/3**
Q-CX 3/35	150	24/29 and 34/35	**224/-**	**41/6**

DOUBLE COIL CONDENSERS

List No.	Effective length mm	Socket	Cone	Six	Each
Quickfit					
Q-C 4/12	200	19/26	19/26	**551/-**	**102/-**
Q-C 4/13	200	24/29	24/29	**556/-**	**103/-**
Q-C 13/55/2	380	34/35	34/35	**1338/-**	**248/-**

JACKETED COIL CONDENSERS

List No.	Effective length mm	Socket	Cone	Six	Each
Quickfit					
Q-CX 6/22	150	19/26	19/26	**475/-**	**88/-**
Q-CX 6/33	150	24/29	24/29	**486/-**	**90/-**
Q-CX 6/05	150	—	34/35	**470/-**	**87/-**
Clearfit					
Q-KCX 6/33	155	24/29	24/29	**486/-**	**90/-**

All items on this page normally available from stock (code *m*).

CONDENSERS

INLAND REVENUE CONDENSERS

List No.	Effective length mm	Socket	Cone	Six	Each
Quickfit					
Q-C 6/12	200	19/26	19/26	**470/–**	**87/–**
Q-C 6/13	200	24/29	24/29	**486/–**	**90/–**

ALLIHN CONDENSERS

List No.	Effective length mm	Socket	Cone	Six	Each
Quickfit					
Q-CX 7/02	200	—	19/26	**197/–**	**36/6**
Q-CX 7/03	200	—	24/29	**202/6**	**37/6**
Q-CX 7/04	200	—	29/32	**205/–**	**38/–**
Q-CX 7/05	200	—	34/35	**208/–**	**38/6**
Q-CX 7/06	200	—	40/38	**218/6**	**40/6**
Q-CX 7/33	300	24/29	24/29	**270/–**	**50/–**
Clearfit					
Q-KCX 7/33	300	24/29	24/29	**299/6**	**55/6**

FRIEDRICHS CONDENSER

List No.	Effective length mm	Socket	Cone	Six	Each
Quickfit					
Q-C10/22	100	19/16	19/16	**337/6**	**62/6**

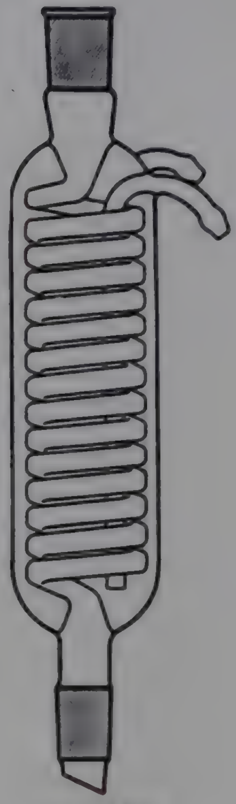
ETHER CONDENSER

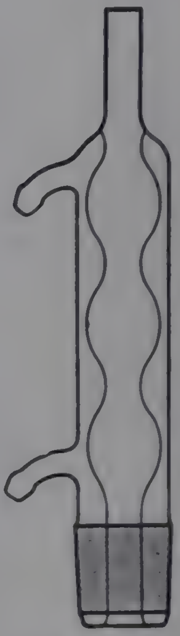
List No.	Effective length mm	Socket	Cone	Six	Each
Clearfit					
Q-KC 11/33	180	24/29	24/29	**897/–**	**166/–**

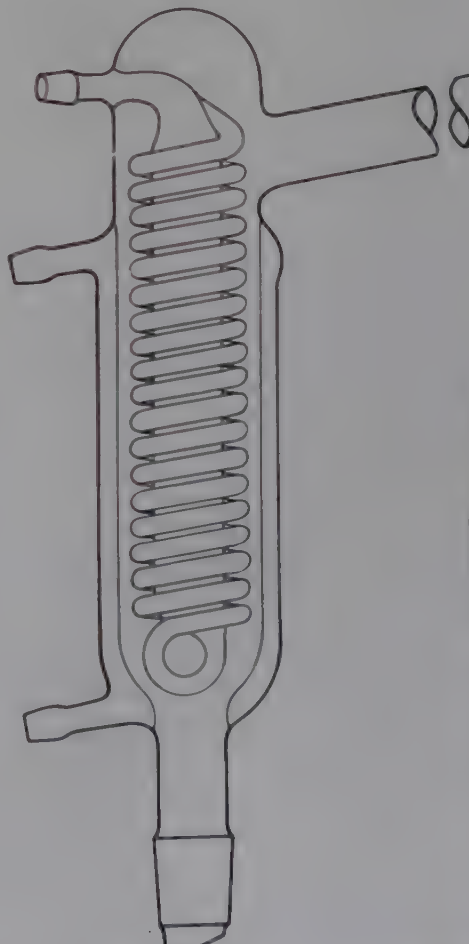
COLD FINGER CONDENSER

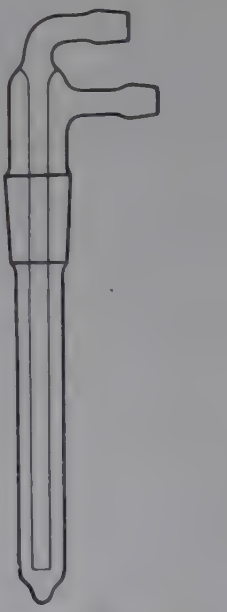
List No.	Effective length mm	Finger diameter mm	Cone	Six	Each
Quickfit					
Q-FC 14/00	100	12	19/26	**116/–**	**21/6**
Clearfit					
Q-KFC 14/00	100	12	19/26	**129/6**	**24/–**

Standard joint condensers see CONDENSERS.


Q-C 6/13


Q-CX 7/06


Q-KC 11/33


Q-KFC 14/00

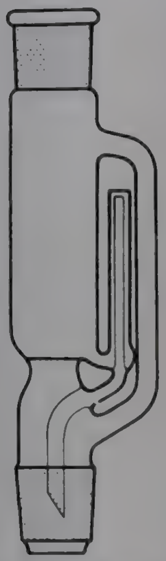
All items on this page normally available from stock (code *m*).

EXTRACTORS

SOXHLET EXTRACTORS, to BS 2071.

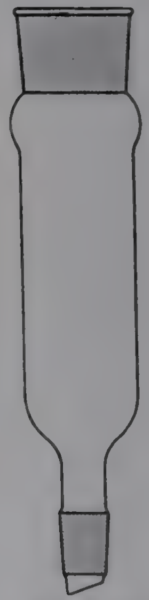
List No.	Nominal capacity	Socket or Flange	Cone	Six	Each
Quickfit					
Q-EX 5/21	6 ml	19/26	14/23	**189/-**	**35/-**
Q-EX 5/32	20 ,,	24/29	19/26	**202/6**	**37/6**
Q-EX 5/43	40 ,,	29/32	24/29	**210/6**	**39/-**
Q-EX 5/53	60 ,,	34/25	24/29	**232/-**	**43/-**
Q-EX 5/55	60 ,,	34/35	34/35	**243/-**	**45/-**
Q-EX 5/55/100	100 ,,	34/35	34/35	**256/6**	**47/6**
Q-EX 5/63	100 ,,	40/38	24/29	**243/-**	**45/-**
Q-EX 5/55/200	200 ,,	34/35	34/35	**302/6**	**56/-**
Q-EX 5/83	200 ,,	50/42	24/29	**308/-**	**57/-**
Q-EX 5/75 *	600 ,,	75 mm	34/35	**950/6**	**176/-**
Q-EX 5/105 *	2 litre	100 mm	34/35	**1393/-**	**258/-**

* Extractors Q-EX 5/75 and Q-EX 5/105 are designed to accommodate large samples up to 75 mm and 100 mm diameter (e.g. wool). They utilise 75 mm and 100 mm flat flange joints together with 34/35 socket adapters, as below. Stainless steel clips are available for the flat flanges.

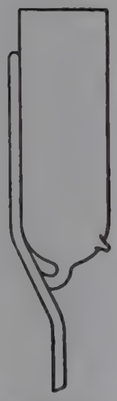


Q-EX 5/55

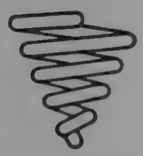
List No.	Description	Socket	Flange	
Quickfit				
Q-DA 5/75	Adapter to fit Q-EX 5/75	34/35	75 mm	For prices see entries on page 645
Q-DA 5/100	Adapter to fit Q-EX 5/105	34/35	100 mm	
JR-260	Clip JC 75F to fit Q-EX 5/75	For prices see entries in List No. sequence		
JR-260	Clip JC 100F to fit Q-EX 5/105			



Q-EX 7/33



Q-EX 7/30



Q-EX 13/23

JACKETED SOXHLET EXTRACTORS, for use with siphon liner or as plain tube with spiral support.

List No.	Description	Nominal capacity ml	Socket	Cone	Six	Each
Quickfit						
Q-EX 7/10	Liner	20	—	—	**89/-**	**16/6**
Q-EX 7/13	Body	—	34/35	24/29	**89/-**	**16/6**
Q-EX 7/15	Body	—	34/35	34/35	**98/6**	**18/3**
Q-EX 7/20	Liner	50	—	—	**101/-**	**18/9**
Q-EX 7/23	Body	—	45/40	24/29	**146/-**	**27/-**
Q-EX 7/30	Liner	100	—	—	**106/6**	**19/9**
Q-EX 7/33	Body	—	55/44	24/29	**162/-**	**30/-**

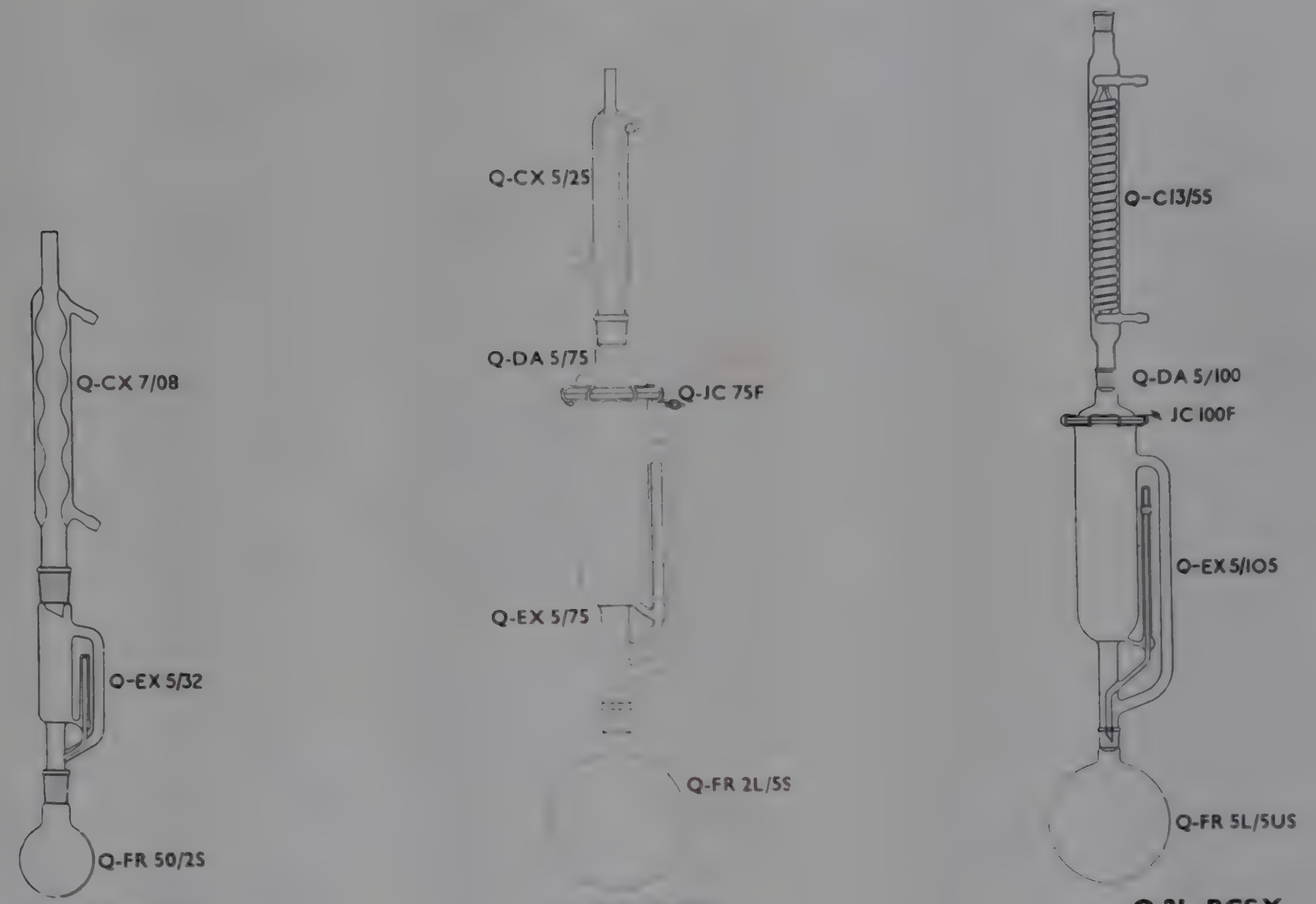
SPIRAL SUPPORTS, for use in extractor tubes and fractionating columns.

List No.	Diameter mm	To fit	Six	Each
Quickfit				
Q-EX 13/12	16	Q-FC 1	**15/-**	**3/11**
Q-EX 13/23	21	Q-FC 7	**16/-**	**4/1**
Q-EX 13/25	29	Q-FC 6 and 8 Q-EX 7/13 and 7/15	**17/6**	**4/4**
Q-EX 13/26	35	Q-EX 7/23 and 7/33	**19/-**	**4/6**

Ⓐ Soxhlet extractors see
EXTRACTION APPARATUS

All items on this page normally available from stock (code *m*).

EXTRACTORS


Q-CX 7/08
Q-EX 5/32
Q-FR 50/2S
Q-CX 5/25
Q-DA 5/75
Q-JC 75F
Q-EX 5/75
Q-FR 2L/5S
Q-C13/55
Q-DA 5/100
JC 100F
Q-EX 5/105
Q-FR 5L/5US

Q-25 RASX **Q-600 RDSX** **Q-2L RCSX**

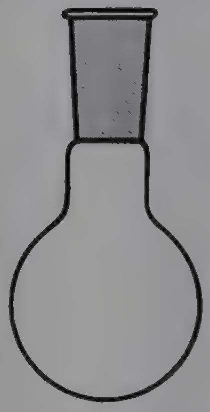
Specimen assemblies of extraction apparatus

SOXHLET LIQUID/SOLID EXTRACTION ASSEMBLIES

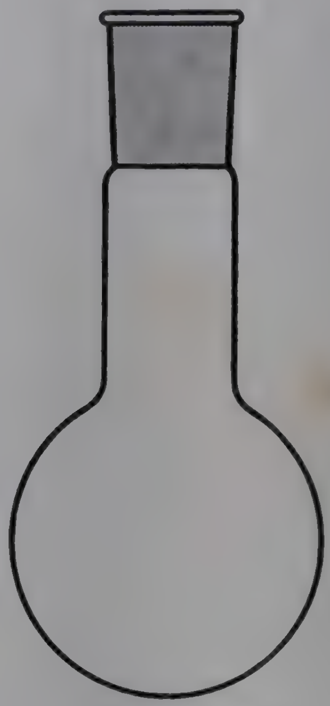
Assembly List No.	COMPONENTS							Suitable thimble size mm	Six	Each
	EXTRACTOR BODY		FLASK		CONDENSER		ADAPTER			
	Capacity ml	List No.	Capacity ml	List No.	Type	List No.	List No.			
Quickfit										
Q-4 PDSX	6	Q-EX 5/21	50	Q-FP 50/1	Davies	Q-C 5/12	—	10× 50	**468/-**	**86/9**
Q-25 RASX	20	Q-EX 5/32	50	Q-FR 50/2S	Allihn	Q-CX 7/03	—	18× 55	**448/-**	**83/-**
Q-40 RASX	40	Q-EX 5/43	100	Q-FR 100/3S	,,	Q-CX 7/04	—	22×80	**468/-**	**86/9**
Q-60 RASX	60	Q-EX 5/53	150	Q-FR 150/3S	,,	Q-CX 7/05	—	28×80	**492/-**	**91/3**
Q-100 RASX	100	Q-EX 5/63	250	Q-FR 250/3S	,,	Q-CX 7/06	—	33×100	**517/-**	**95/9**
Q-200 RASX	200	Q-EX 5/83	500	Q-FR 500/3S	,,	Q-CX 7/08	—	41×130	**622/6**	**115/3**
									Two	Each
Q-600 RDSX	600	Q-EX 5/75	2000	Q-FR 2L/5S	Davies	Q-CX 5/25	Q-DA 5/75	60×160	**555/-**	**308/3**
Q-2L RCSX	2000	Q-EX 5/105	5000	Q-FR 5L/5US	Coil	Q-C 13/55	Q-DA 5/100	95×200	**1050/8**	**583/6**

All items on this page normally available from stock (code *m*).

FLASKS



Q-FR 25/1S



Q-FR 100/3M

FLASKS, round bottom, medium neck.

List No.	Capacity ml	Socket	Dozen	Each
Quickfit				
Q-FR 50/1M	50	14/23	92/–	8/9
Q-FR 50/3M	50	24/29	89/–	8/6
Q-FR 100/1M	100	14/23	103/–	9/6
Q-FR 100/2M	100	19/26	97/–	9/–
Q-FR 100/3M	100	24/29	103/–	9/6
Q-FR 150/3M	150	24/29	108/–	10/–
Q-FR 250/2M	250	19/26	127/–	11/9
Q-FR 250/3M	250	24/29	116/–	10/9
			Six	Each
Q-FR 500/3M	500	24/29	67/6	12/6
Q-FR 500/4U	500	29/32	70/–	13/–
Q-FR 500/5M	500	34/35	77/–	14/3
Q-FR 1L/3UM	1000	24/29	78/6	14/6
Q-FR 1L/4UM	1000	29/32	86/6	16/–
Q-FR 1L/5M	1000	34/35	90/6	16/9
Q-FR 2L/3M	2000	24/29	140/6	26/–
Q-FR 2L/5UM	2000	34/35	140/6	26/–

FLASKS, round bottom, short neck.

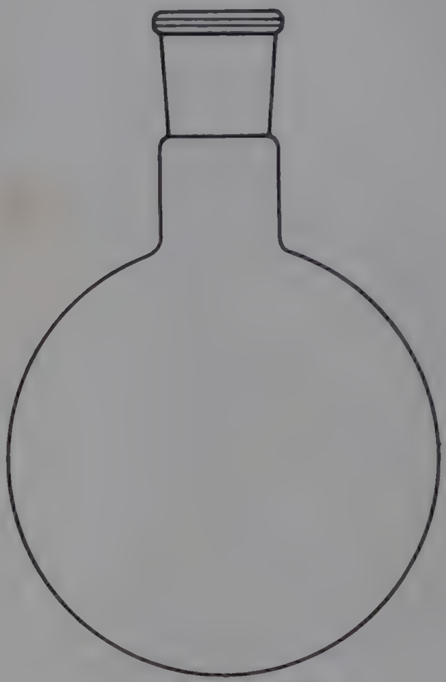
List No.	Capacity ml	Socket	Dozen	Each
Quickfit				
Q-FR 5/0S	5	10/19	72/–	7/2
Q-FR 5/1S	5	14/23	67/–	6/10
Q-FR 10/1S	10	14/23	73/–	7/4
Q-FR 25/1S	25	14/23	76/–	7/6
Q-FR 25/2S	25	19/26	67/–	6/10
Q-FR 25/3S	25	24/29	70/–	7/–
Q-FR 50/1S	50	14/23	89/–	8/6
Q-FR 50/2S	50	19/26	88/–	8/3
Q-FR 50/3S	50	24/29	89/–	8/6
Q-FR 100/1S	100	14/23	103/–	9/6
Q-FR 100/2S	100	19/26	94/–	8/9
Q-FR 100/3S	100	24/29	105/–	9/9
Q-FR 100/4S	100	29/32	105/–	9/9
Q-FR 100/5S	100	34/35	116/–	10/9
Q-FR 150/2S	150	19/26	108/–	10/–
Q-FR 150/3S	150	24/29	105/–	9/9
Q-FR 150/5S	150	34/35	117/–	10/9
Q-FR 250/2S	250	19/26	119/–	11/–
Q-FR 250/3S	250	24/29	111/–	10/3
			Six	Each
Q-FR 250/4S	250	29/32	59/6	11/–
Q-FR 250/5S	250	34/35	67/6	12/6
Q-FR 500/2S	500	19/26	69/–	12/9
Q-FR 500/3S	500	24/29	65/–	12/–
Q-FR 500/4S	500	29/32	70/–	13/–
Q-FR 500/5S	500	34/35	75/6	14/–
Q-FR 1L/3S	1000	24/29	73/–	13/6
Q-FR 1L/4S	1000	29/32	79/6	14/9
Q-FR 1L/5S	1000	34/35	89/–	16/6
Q-FR 2L/3S	2000	24/29	131/–	24/3
Q-FR 2L/4S	2000	29/32	131/–	24/3
Q-FR 2L/5S	2000	34/35	131/–	24/3
Q-FR 3L/3S	3000	24/29	140/–	31/6
Q-FR 3L/5S	3000	34/35	178/–	33/–
Q-FR 5L/5US	5000	34/35	270/–	50/–
Q-FR 5L/9S	5000	55/44	291/6	54/–

All items on this page normally available from stock (code *m*).

FLASKS

FLASKS, round bottom, short neck.

List No.	Capacity ml	Socket	Dozen	Each
Clearfit				
Q-KFR 5/1S	5	14/23	84/-	8/-
Q-KFR 10/1S	10	14/23	84/-	8/-
Q-KFR 25/1S	25	14/23	86/-	8/3
Q-KFR 25/2S	25	19/26	89/-	8/6
Q-KFR 25/3S	25	24/29	94/-	8/9
Q-KFR 50/1S	50	14/23	105/-	9/9
Q-KFR 50/2S	50	19/26	105/-	9/9
Q-KFR 50/3S	50	24/29	108/-	10/-
Q-KFR 50/4S	50	29/32	113/-	10/6
Q-KFR 100/1S	100	14/23	111/-	10/3
Q-KFR 100/2S	100	19/26	111/-	10/3
Q-KFR 100/3S	100	24/29	113/-	10/6
Q-KFR 100/4S	100	29/32	121/-	11/3
Q-KFR 150/2S	150	19/26	132/-	12/3
Q-KFR 150/3S	150	24/29	132/-	12/3
			Six	Each
Q-KFR 250/2S	250	19/26	69/-	12/9
Q-KFR 250/3S	250	24/29	73/-	13/6
Q-KFR 250/4S	250	29/32	78/-	14/6
Q-KFR 500/2S	500	19/26	94/6	17/6
Q-KFR 500/3S	500	24/29	78/6	14/6
Q-KFR 500/4S	500	29/32	79/6	14/9
Q-KFR 1L/3S	1000	24/29	89/-	16/6
Q-KFR 1L/4S	1000	29/32	94/6	17/6
Q-KFR 2L/3S	2000	24/29	135/-	25/-
Q-KFR 2L/4S	2000	29/32	136/6	25/3
Q-KFR 3L/4S	3000	29/32	181/-	33/6
Q-KFR 5L/4S	5000	29/32	264/-	49/-

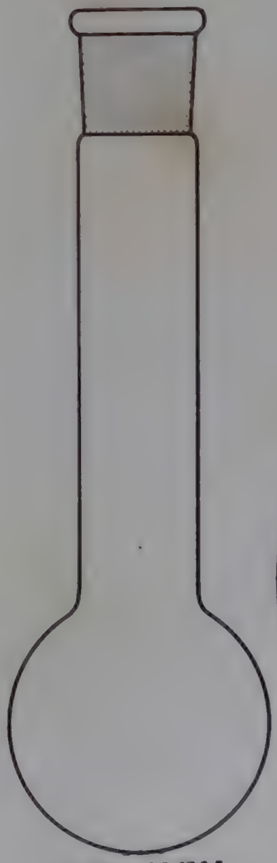


Q-KFR 500/4S

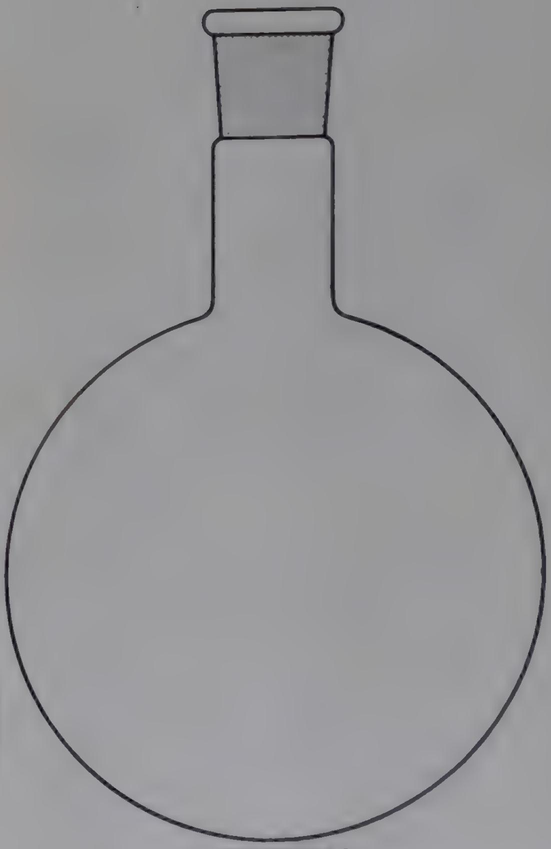
FLASKS, round bottom, uniform height.
FLASKS, with joint size 24/29 and 29/32, height 205 mm.
FLASKS, with joint size 34/35, height 275 mm.

List No.	Capacity ml	Socket	Six	Each
Quickfit				
Q-FR 100/3U	100	24/29	51/6	9/6
Q-FR 250/3U	250	24/29	59/6	11/-
Q-FR 500/3U	500	24/29	67/6	12/6
Q-FR 500/4U	500	29/32	For prices see page 652	
Q-FR 1L/3UM	1000	24/29		
Q-FR 1L/4UM	1000	29/32		
Q-FR 2L/3US	2000	24/29	133/6	24/9
Q-FR 2L/5UM	2000	34/35	For prices see page 652	
Q-FR 5L/5US	5000	34/35		

Ⓐ **Standard joint flasks see FLASKS**



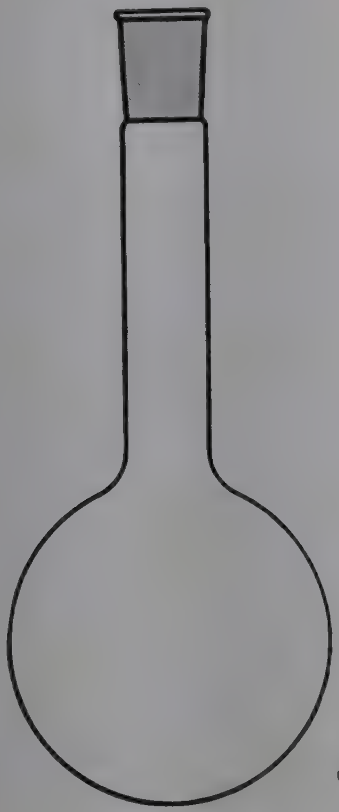
Q-FR 100/3U



Q-FR 500/3U

All items on this page normally available from stock (code *m*).

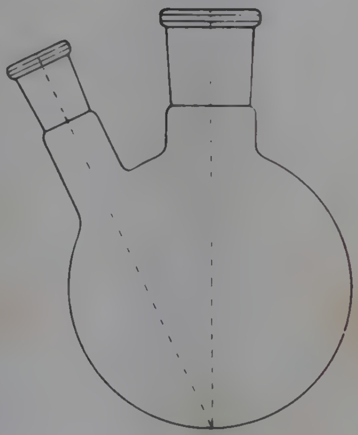
FLASKS



Q-FR 500/3L

FLASKS, round bottom, long neck.

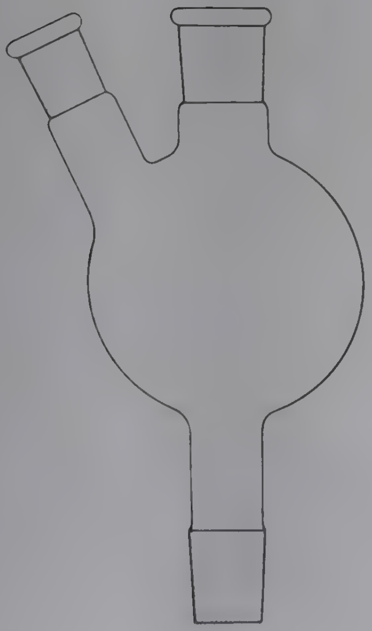
List No.	Capacity ml	Socket	Dozen	Each
Quickfit				
Q-FR 100/3U	100	24/29	For price see entry on page 653	
Q-FR 250/3L	250	24/29	**121/–**	**11/3**
Q-FR 500/3L	500	24/29	**143/–**	**13/3**
Q-FR 1L/3L	1000	24/29	**157/–**	**14/6**



Q-KFR 250/3S/2A

FLASKS, round bottom, two necks. With short centre neck and angled side neck.

List No.	Capacity ml	Centre socket	Side socket	Six	Each
Quickfit					
Q-FR 100/3S/1A	100	24/29	14/23	**96/–**	**17/9**
Q-FR 250/3S/1A	250	24/29	14/23	**100/–**	**18/6**
Q-FR 250/3S/2A	250	24/29	19/26	**110/6**	**20/6**
Q-FR 500/3S/1A	500	24/29	14/23	**108/–**	**20/–**
Q-FR 500/3S/2A	500	24/29	19/26	**120/–**	**22/3**
Q-FR 1L/3S/1A	1000	24/29	14/23	**131/–**	**24/3**
Q-FR 2L/5S/2A	2000	34/35	19/26	**205/–**	**38/–**
Clearfit					
Q-KFR 100/3S/1A	100	24/29	14/23	**110/6**	**20/6**
Q-KFR 250/3S/1A	250	24/29	14/23	**127/–**	**23/6**
Q-KFR 250/3S/2A	250	24/29	19/26	**136/6**	**25/3**
Q-KFR 250/4S/4A	250	29/32	29/32	**215/–**	**28/9**
Q-KFR 500/4S/4A	500	29/32	29/32	**156/6**	**29/–**
Q-KFR 1L/3S/1A	1000	24/29	14/23	**155/–**	**26/6**



Q-RA 332/250

FLASKS, round bottom, two necks and bottom outlet. Side socket size 19/26.

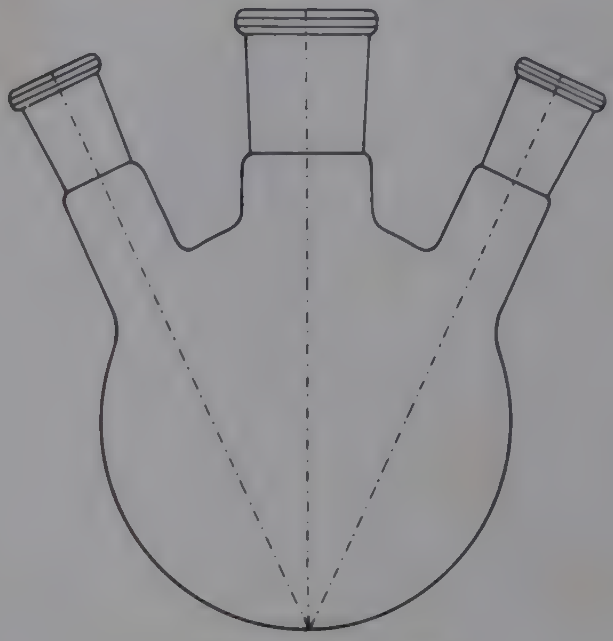
List No.	Capacity ml	Centre socket	Bottom cone	Six	Each
Quickfit					
Q-RA 332/250	250	24/29	24/29	**200/–**	**37/–**
Q-RA 552/500	500	34/35	34/35	**210/6**	**39/–**
Q-RA 552/1L	1000	34/35	34/35	**237/6**	**44/–**
Q-RA 552/2L	2000	34/35	34/35	**275/6**	**51/–**

All items on this page normally available from stock (code *m*).

FLASKS

FLASKS, round bottom, three necks. With short centre neck and two angled side necks.

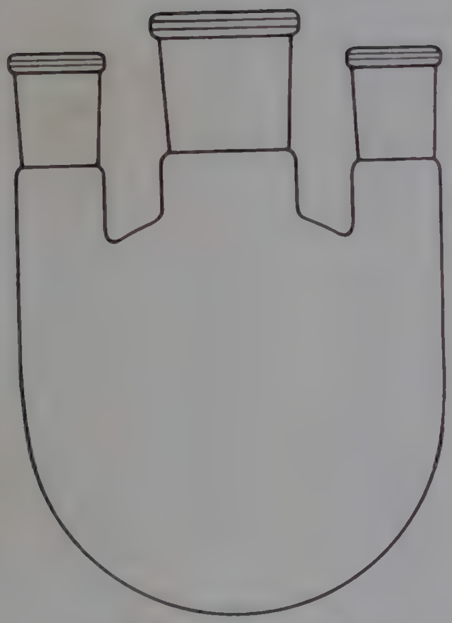
List No.	Capacity ml	Centre socket	Side sockets	Six	Each
Quickfit					
Q-FR 250/3S/11A	250	24/29	14/23	140/6	26/-
Q-FR 250/3S/22A	250	24/29	19/26	167/6	31/-
Q-FR 500/3S/11A	500	24/29	14/23	151/-	28/-
Q-FR 500/3S/22A	500	24/29	19/26	175/6	32/6
Q-FR 1L/3S/11A	1000	24/29	14/23	167/6	31/-
Q-FR 1L/3S/22A	1000	24/29	19/26	189/-	35/-
Q-FR 1L/5S/22A	1000	34/35	19/26	208/-	38/6
Q-FR 2L/3US/22A	2000	34/35	19/26	270/-	50/-
Q-FR 2L/5S/22A	2000	34/35	19/26	262/-	48/6
Clearfit					
Q-KFR 250/2S/22A	250	19/26	19/26	194/6	36/-
Q-KFR 250/3S/22A	250	24/29	19/26	200/-	37/-
Q-KFR 250/3S/11A	250	24/29	14/23	181/-	33/6
Q-KFR 250/4S/11A	250	29/32	14/23	186/6	34/6
Q-KFR 500/2S/22A	500	19/26	19/26	221/6	41/-
Q-KFR 500/3S/22A	500	24/29	19/26	205/-	38/-
Q-KFR 500/4S/11A	500	29/32	14/23	189/-	35/-
Q-KFR 1L/3S/22A	1000	24/29	19/26	216/-	40/-
Q-KFR 1L/4S/44A	1000	29/32	29/32	254/-	47/-



Q-KFR 500/3S/22A

FLASKS, round bottom, three parallel necks.

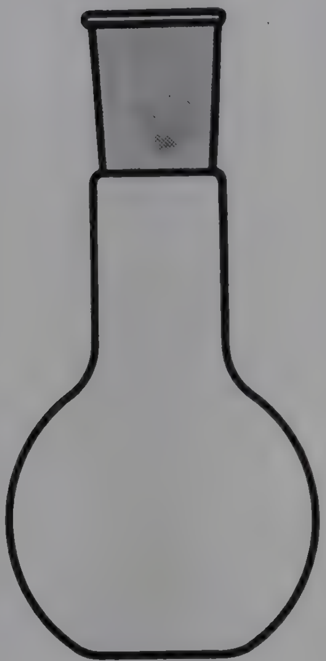
List No.	Capacity ml	Centre socket	Side sockets	Six	Each
Quickfit					
Q-FR 250/3S/22P	250	24/29	19/26	182/6	33/6
Q-FR 500/3S/22P	500	24/29	19/26	191/6	35/6
Q-FR 1L/3S/22P	1000	24/29	19/26	200/-	37/-
Q-FR 1L/5S/22P	1000	24/29	19/26	218/6	40/6
Q-FR 2L/3US/22P	2000	24/29	19/26	281/-	52/-
Q-FR 2L/5S/22P	2000	34/35	19/26	272/6	50/6
Q-FR 2L/5S/33P	2000	34/35	24/29	297/-	55/-
Q-FR 3L/5S/22P	3000	34/35	19/26	367/-	65/-
Q-FR 3L/5S/33P	3000	34/35	24/29	394/-	73/-
Q-FR 5L/5US/33P	5000	34/35	24/29	459/-	85/-
Clearfit					
Q-KFR 250/3S/22P	250	24/29	19/26	205/-	38/6
Q-KFR 250/4S/11P	250	29/32	14/23	194/6	36/-
Q-KFR 500/3S/22P	500	24/29	19/26	213/-	39/6
Q-KFR 500/4S/11P	500	29/32	14/23	197/-	36/6
Q-KFR 500/4S/44P	500	29/32	29/32	248/-	46/6
Q-KFR 1L/3S/22P	1000	24/29	19/26	224/-	41/6
Q-KFR 1L/4S/44P	1000	29/32	29/32	283/6	52/6
Q-KFR 2L/4S/44P	2000	29/32	29/32	324/-	60/-
Q-KFR 3L/4S/44P	3000	29/32	29/32	378/-	70/-
Q-KFR 5L/4S/44P	5000	29/32	29/32	475/-	88/-



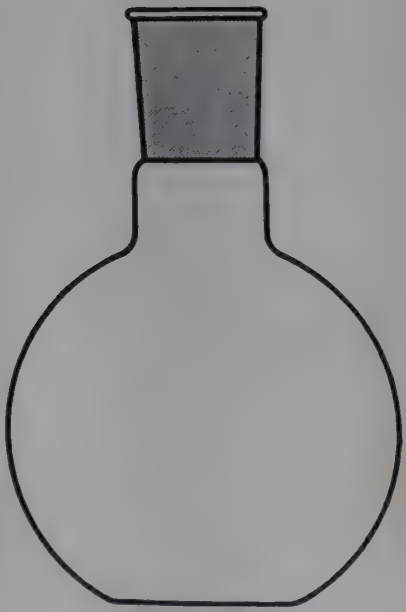
Q-KFR 500/3S/22P

All items on this page normally available from stock (code *m*).

FLASKS



Q-FF 250/3M



Q-FF 500/4S

FLASKS, flat bottom, medium neck.

List No.	Capacity ml	Socket	Dozen	Each
Quickfit				
Q-FF 100/3M	100	24/29	97/–	9/–
Q-FF 150/3M	150	24/29	111/–	10/3
Q-FF 250/2M	250	19/26	121/–	11/3
Q-FF 250/3M	250	24/29	121/–	11/3
Q-FF 250/4M	250	29/32	121/–	11/3
			Six	Each
Q-FF 500/3UM	500	24/29	63/6	11/9
Q-FF 500/4UM	500	29/32	67/6	12/6
Q-FF 1L/3M	1000	24/29	82/6	15/3

FLASKS, flat bottom, short neck.

List No.	Capacity ml	Socket	Dozen	Each
Quickfit				
Q-FF 50/2S	50	19/26	86/–	8/3
Q-FF 50/3S	50	24/29	86/–	8/3
Q-FF 100/2S	100	19/26	97/–	9/–
Q-FF 100/3S	100	24/29	97/–	9/–
Q-FF 100/5S	100	34/35	111/–	10/3
Q-FF 150/2S	150	19/26	111/–	10/3
Q-FF 150/3S	150	24/29	103/–	9/6
Q-FF 150/4S	150	29/32	106/–	9/9
Q-FF 150/5S	150	34/35	116/–	10/9
Q-FF 250/2S	250	19/26	119/–	11/–
Q-FF 250/3S	250	24/29	108/–	10/–
Q-FF 250/4S	250	29/32	121/–	11/3
Q-FF 250/5S	250	34/35	130/–	12/–
			Six	Each
Q-FF 350/3S	350	24/29	59/6	11/–
Q-FF 500/3S	500	24/29	59/6	11/–
Q-FF 500/4S	500	29/32	65/–	12/–
Q-FF 500/5S	500	34/35	71/6	13/3
Q-FF 1L/3US	1000	24/29	81/–	15/–
Q-FF 1L/4US	1000	29/32	81/–	15/–
Q-FF 1L/5S	1000	34/35	89/–	16/6
Q-FF 2L/3S	2000	24/29	135/–	25/–
Q-FF 2L/4S	2000	29/32	135/–	25/–
Q-FF 2L/5S	2000	34/35	129/6	24/–
Clearfit				
Q-KFF 100/3S	100	24/29	56/6	10/6
Q-KFF 150/3S	150	24/29	65/–	12/–
Q-KFF 250/3S	250	24/29	67/6	12/6
Q-KFF 500/3S	500	24/29	73/–	13/6

FLASKS, flat bottom, uniform height, (170 mm).

List No.	Capacity ml	Socket	Dozen	Each
Quickfit				
Q-FF 250/3U	250	24/29	119/–	11/–
Q-FF 500/3UM	500	24/29	See entries above for prices	
Q-FF 500/4UM	500	29/32		
Q-FF 1L/3US	1000	24/29		
Q-FF 1L/4US	1000	29/32		

All items on this page normally available from stock (code *m*).

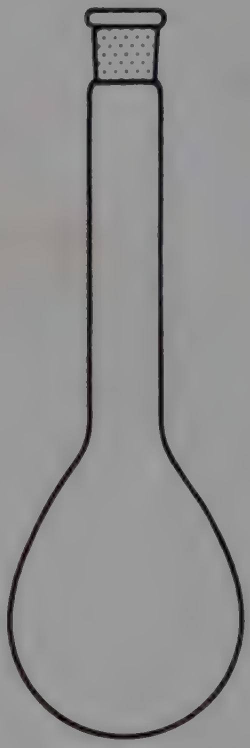
FLASKS

FLASKS, Kjeldahl, long neck, round bottom.

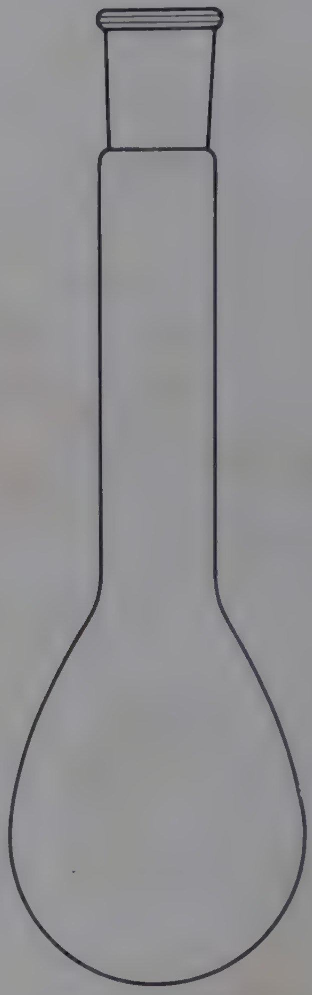
List No.	Capacity ml	Socket	Six	Each
Quickfit				
Q-FK 100/3L	100	24/29	**70/–**	**13/–**
Q-FK 200/3L	200	24/29	**70/–**	**13/–**
Q-FK 300/3L	300	24/29	**70/–**	**13/–**
Q-FK 500/3L	500	24/29	**73/–**	**13/6**
Q-FK 800/3L	800	24/29	**100/–**	**18/6**
Clearfit				
Q-KFK 300/3L	300	24/29	**75/6**	**14/–**
Q-KFK 500/3L	500	24/29	**81/–**	**15/–**
Q-KFK 800/3L	800	24/29	**108/–**	**20/–**

FLASKS, conical.

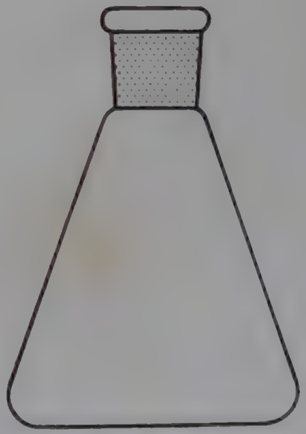
List No.	Capacity ml	Socket	Dozen	Each
Quickfit				
Q-FE 5/0	5	10/19	**103/–**	**9/6**
Q-FE 10/1	10	14/23	**105/–**	**9/9**
Q-FE 25/0	25	10/19	**116/–**	**10/9**
Q-FE 25/1	25	14/23	**94/–**	**8/9**
Q-FE 50/1	50	14/23	**103/–**	**9/6**
Q-FE 50/2	50	19/26	**97/–**	**9/–**
Q-FE 50/3	50	24/29	**97/–**	**9/–**
Q-FE 100/1	100	14/23	**113/–**	**10/6**
Q-FE 100/2	100	19/26	**113/–**	**10/6**
Q-FE 100/3	100	24/29	**108/–**	**10/–**
Q-FE 150/2	150	19/26	**127/–**	**11/9**
Q-FE 150/3	150	24/29	**127/–**	**11/9**
Q-FE 250/2	250	19/26	**124/–**	**11/6**
Q-FE 250/3	250	24/29	**119/–**	**11/–**
Q-FE 250/4	250	29/32	**119/–**	**11/–**
Q-FE 250/5	250	34/35	**121/–**	**11/3**
			Six	Each
Q-FE 350/3	350	24/29	**65/–**	**12/–**
Q-FE 500/3	500	24/29	**60/6**	**11/3**
Q-FE 500/4	500	29/32	**65/–**	**12/–**
Q-FE 500/5	500	34/35	**65/–**	**12/–**
Q-FE 1L/3	1000	24/29	**81/–**	**15/–**
Q-FE 1L/4	1000	29/32	**83/6**	**15/6**
Q-FE 1L/5	1000	34/35	**85/–**	**15/9**
Q-FE 2L/5	2000	34/35	**140/6**	**26/–**
Clearfit				
Q-KFE 10/1	10	14/23	**59/6**	**11/–**
Q-KFE 25/1	25	14/23	**59/6**	**11/–**
Q-KFE 50/1	50	14/23	**60/6**	**11/3**
Q-KFE 50/2	50	19/26	**60/6**	**11/3**
Q-KFE 50/3	50	24/29	**60/6**	**11/3**
Q-KFE 100/2	100	19/26	**62/–**	**11/6**
Q-KFE 100/3	100	24/29	**62/–**	**11/6**
Q-KFE 150/3	150	24/29	**74/–**	**13/9**
Q-KFE 250/3	250	24/29	**73/–**	**13/6**
Q-KFE 250/4	250	29/32	**75/6**	**14/–**
Q-KFE 500/3	500	24/29	**75/6**	**14/–**
Q-KFE 500/4	500	29/32	**75/6**	**14/–**
Q-KFE 1L/3	1000	24/29	**90/6**	**16/9**



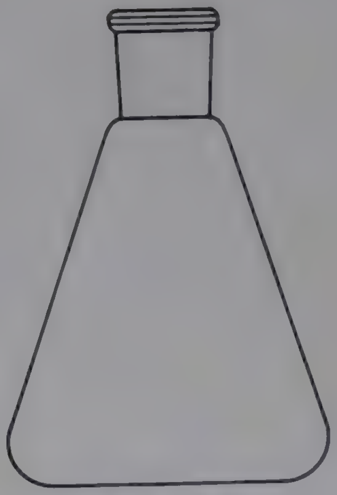
Q-FK 200/3L



Q-KFK 500/3L



Q-FE 250/3
Q-FEH 250/3



Q-KFE 250/3
Q-KFEH 250/3

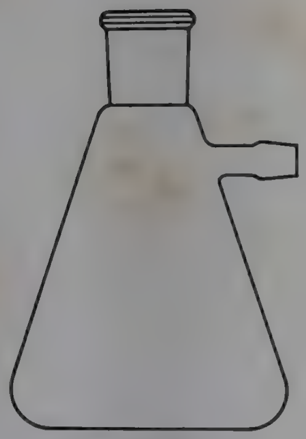
All items on this page normally available from stock (code *m*).

FLASKS

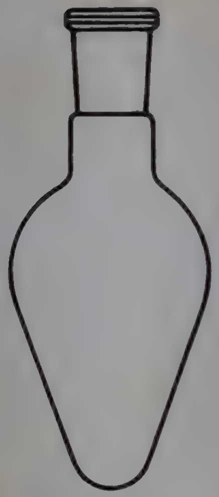
FLASKS, conical, heavy wall.

List No.	Capacity ml	Socket	Six	Each
Quickfit				
Q-FEH 100/2	100	19/26	**75/6**	**14/–**
Q-FEH 250/3	250	24/29	**100/–**	**18/6**
Clearfit				
Q-KFEH 250/3	250	24/29	**109/6**	**20/3**

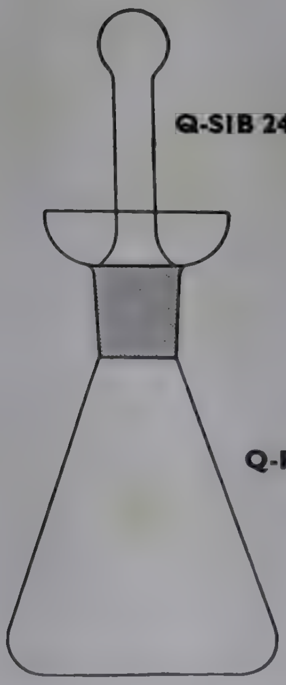
For illustrations see previous page.



Q-KFB 250/3



Q-KFP 10/1



FLASKS, Buchner or filtration.

List No.	Capacity ml	Socket	Six	Each
Quickfit				
Q-FB 100/2	100	19/26	**105/6**	**19/6**
Q-FB 250/3	250	24/29	**128/–**	**23/9**
Q-FB 500/3	500	24/29	**146/–**	**27/–**
Q-FB 1L/3	1000	24/29	**194/6**	**36/–**
Clearfit				
Q-KFB 100/2	100	19/26	**112/–**	**20/9**
Q-KFB 100/3	100	24/29	**116/–**	**21/6**
Q-KFB 250/3	250	24/29	**137/6**	**25/6**
Q-KFB 250/4	250	29/32	**137/6**	**25/6**
Q-KFB 500/3	500	24/29	**155/–**	**28/9**
Q-KFB 500/4	500	29/32	**155/–**	**28/9**
Q-KFB 1L/3	1000	24/29	**194/6**	**36/–**

FLASKS, iodine, to BS 2735.

List No.	Capacity ml	Socket	Six	Each
Quickfit				
Q-FIB 250/3	250	24/29	**159/6**	**29/6**
Q-FIB 500/3	500	24/29	**170/–**	**31/6**
Q-SIB 24 STOPPER, for iodine flasks			For price see entry on page 668.	

Ⓐ **Iodine flasks see FLASKS**

PEAR SHAPED SEMI-MICRO FLASKS

Single Neck

List No.	Capacity ml	Socket	Dozen	Each
Quickfit				
Q-FP 5/0	5	10/19	**97/–**	**9/–**
Q-FP 10/1	10	14/23	**108/–**	**10/–**
Q-FP 25/0	25	10/19	**108/–**	**10/–**
Q-FP 25/1	25	14/23	**97/–**	**9/–**
Q-FP 50/1	50	14/23	**105/–**	**9/9**
Q-FP 100/2	100	19/26	**130/–**	**12/–**
			Six	Each
Clearfit				
Q-KFP 5/1	5	14/23	**52/6**	**9/9**
Q-KFP 10/1	10	14/23	**60/6**	**11/3**
Q-KFP 25/1	25	14/23	**63/6**	**11/9**
Q-KFP 50/1	50	14/23	**67/6**	**12/6**

All items on this page normally available from stock (code *m*).

FLASKS

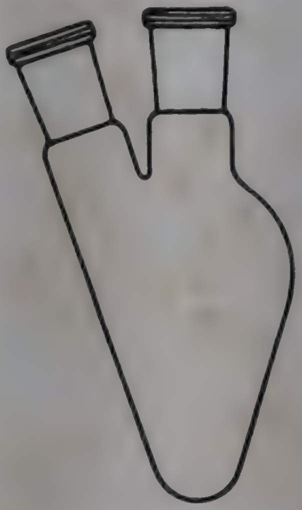
SEMI-MICRO FLASKS
(continued)

Two necks, side neck at angle

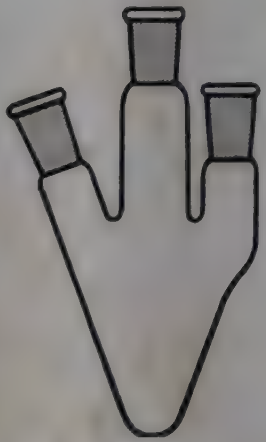
List No.	Capacity ml	Sockets	Six	Each
Quickfit **Q-FP 50/1/1A**	50	14/23	**110/6**	**20/6**
Clearfit **Q-KFP 50/1/1A**	50	14/23	**140/6**	**26/–**

Three necks, one side neck parallel, other angled

List No.	Capacity ml	Sockets	Dozen	Each
Quickfit **Q-FP 25/0AP**	25	10/19	**329/–**	**30/6**



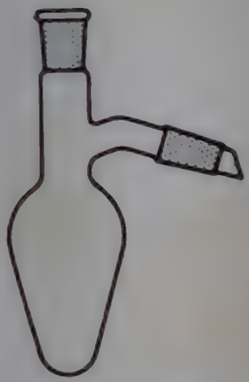
Q-KFP 50/1/1A



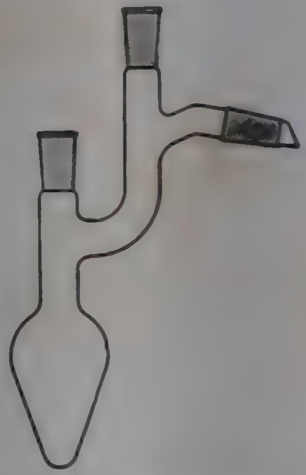
Q-FP 25/0AP

Distillation

List No.	Capacity ml	Socket	Cone	Six	Each
Quickfit					
Q-MD 2/10	10	14/23	14/23	**97/–**	**18/–**
Q-MD 2/25	25	14/23	14/23	**94/6**	**17/6**
Q-MD 2/50	50	14/23	14/23	**101/–**	**18/9**
Q-MD 2/100	100	14/23	14/23	**116/–**	**21/6**



Q-MD 2/25



Q-MD 3/10

Claisen

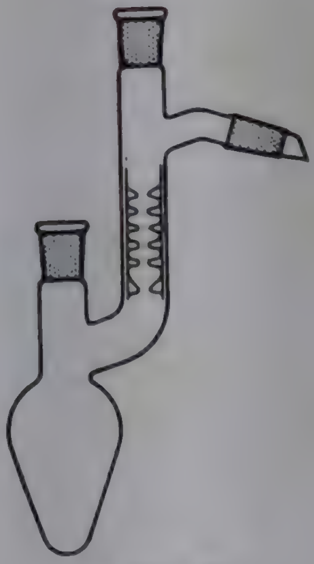
List No.	Capacity ml	Sockets	Cone	Six	Each
Quickfit					
Q-MD 3/10	10	14/23	14/23	**151/–**	**28/–**
Q-MD 3/0/25	25	10/19	10/19	**143/–**	**26/6**
Q-MD 3/25	25	14/23	14/23	**148/6**	**27/6**
Q-MD 3/50	50	14/23	14/23	**152/6**	**28/3**
Q-MD 3/100	100	14/23	14/23	**166/–**	**30/9**

Claisen—Vigreux

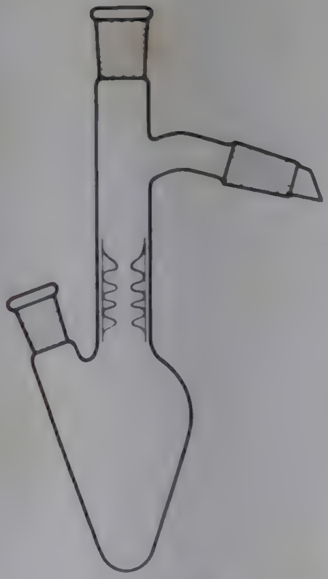
List No.	Capacity ml	Sockets	Cone	Six	Each
Quickfit					
Q-MD 4/25	25	14/23	14/23	**191/6**	**35/6**
Q-MD 4/50	50	14/23	14/23	**197/–**	**36/6**
Q-MD 4/100	100	14/23	14/23	**210/6**	**39/–**

Vigreux—with angled neck, main socket 14/23.

List No.	Capacity ml	Angle socket	Side cone	Six	Each
Quickfit					
Q-MD 7/10	10	10/19	14/23	**189/–**	**35/–**
Q-MD 7/25	25	10/19	14/23	**186/6**	**34/6**
Q-MD 7/50	50	10/19	14/23	**189/–**	**35/–**



Q-MD 4/25

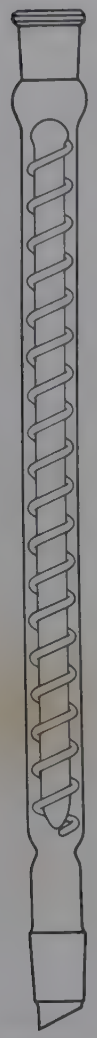


Q-MD 7/50

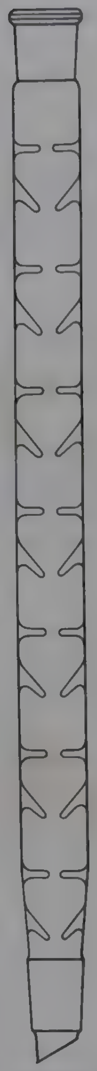
All items on this page normally available from stock (code *m*).

FRACTIONATION

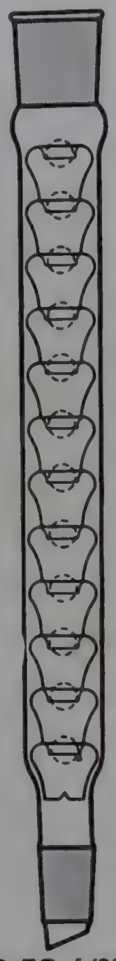
FRACTIONATING COLUMNS



Q-KFC 2/23



Q-KFC 3/13



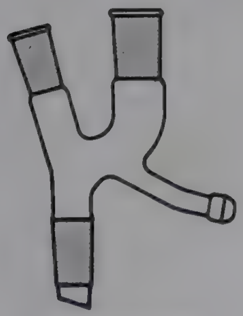
Q-FC 6/23A with Q-FC 6/00 and Q-FC 6/10

Q-KFC 7/23

List No.	Type	Socket	Cone	Effective length mm	Six	Each
Quickfit						
Q-FC 1/12	Dufton	19/26	19/26	150	**237/6**	**44/–**
Q-FC 1/22	Dufton	19/26	19/26	300	**270/–**	**50/–**
Q-FC 2/13	Dufton	24/29	24/29	150	**243/–**	**45/–**
Q-FC 2/23	Dufton	24/29	24/29	300	**286/–**	**53/–**
Q-FC 3/13	Vigreux	24/29	24/29	360	**221/6**	**41/–**
Q-FC 6/23A	Jacket only to take 12 bulbs (and bubbles)	34/35	24/29	225	**229/6**	**42/6**
Q-FC 6/00	Pear bulbs, for above	—	—	—	**24/6**	**5/4**
Q-FC 6/10	Bubbles, for above	—	—	—	**11/–**	**3/4**
Q-FC 7/23	Plain columns ...	24/29	24/29	250	For prices see entries on page 647	
Q-FC 7/43	Plain columns ...	24/29	24/29	500		
Q-FC 7/53	Plain columns ...	24/29	24/29	750		
Q-FC 8/23	Plain columns ...	34/35	24/29	250	**119/–**	**22/–**
Q-FC 8/43	Plain columns ...	34/35	24/29	500	**170/–**	**31/6**
Clearfit						
Q-KFC 1/12	Dufton	19/26	19/26	150	**259/–**	**48/–**
Q-KFC 2/13	Dufton	24/29	24/29	150	**270/–**	**50/–**
Q-KFC 1/22	Dufton	19/26	19/26	300	**297/–**	**55/–**
Q-KFC 2/23	Dufton	24/29	24/29	300	**335/–**	**62/–**
Q-KFC 3/13	Vigreux	24/29	24/29	360	**248/6**	**46/–**
Q-KFC 3/14	Vigreux	29/32	29/32	360	**291/6**	**54/–**
Q-KFC 3/23	Vigreux	24/29	24/29	600	**389/–**	**72/–**
Q-KFC 7/23	Plain columns ...	24/29	24/29	250	**121/6**	**22/6**
Q-KFC 7/43	Plain columns ...	24/29	24/29	500	**148/6**	**27/6**
Q-KFC 7/44	Plain columns ...	29/32	29/32	500	**173/–**	**32/–**
Q-KFC 7/53	Plain columns ...	24/29	24/29	750	**170/–**	**31/6**

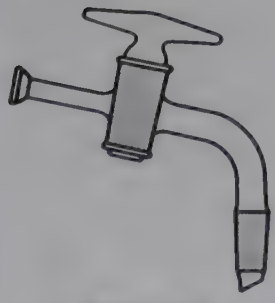
Standard joint fractionating columns see DISTILLATION APPARATUS

REFLUX HEADS



Q-FC 15/32

List No.	Description	Socket for reflux condenser	Thermo socket	Cone for column	Cone for condenser	Six	Each
Quickfit							
Q-FC 14/00	Cold finger condenser ...	—	—	—	19/26	For price see entry on page 649	
Q-FC 15/32	Sluice type head ...	19/26	14/23	24/29	—	**216/–**	**40/–**
Q-FC 15/2	Distillate delivery adapter with fine adjustment stopcock for Q-FC 15/32			—	19/26	**502/–**	**93/–**
Clearfit							
Q-KFC 14/00	Cold finger condenser ...	—	—	—	19/26	For price see entry on page 649	



Q-FC 15/2

PACKING, for plain columns, in bags of 1 litre.

List No.	Description	Diameter mm	Effective length mm	Six bags	Bag
Quickfit					
Q-FC 8/06	Raschig rings ...	6	6	**243/–**	**45/–**

For suitable spiral supports for column packing see Q-EX 13/12 and Q-EX 13/23 on page 650.

All items on this page normally available from stock (code *m*).

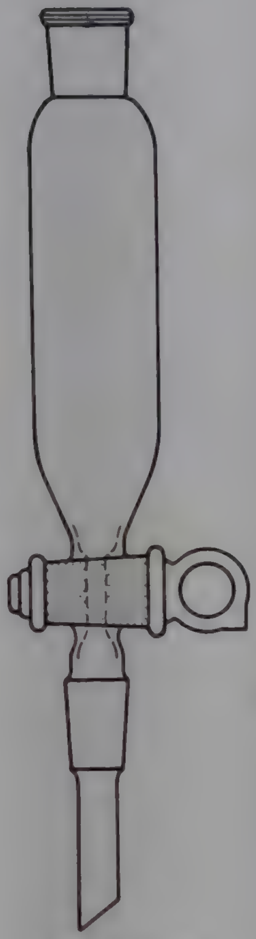
FUNNELS

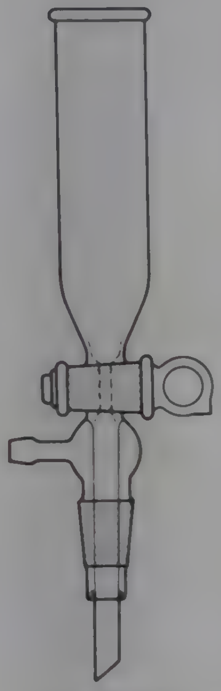
SEPARATING AND DROPPING FUNNELS

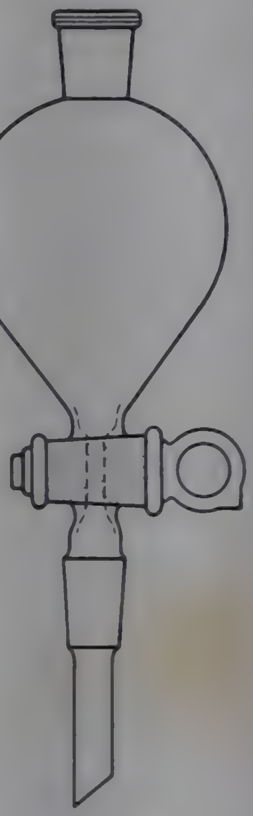
The length of stem below the cone is made to fit adapters Q-MA 2 and Q-MA 4, listed on pages 640/641. All stopcocks have interchangeable keys and plastics retaining ring.

Cylindrical, with socket and cone.

List No.	Capacity ml	Socket	Cone	Six	Each
Quickfit					
Q-D 1/00	20	10/19	10/13	**200/–**	**37/–**
Q-D 1/01	25	14/23	14/23	**178/–**	**33/–**
Q-D 1/11	50	14/23	14/23	**181/–**	**33/6**
Q-D 1/21	100	14/23	14/23	**191/6**	**35/6**
Q-D 1/22	100	19/26	19/26	**218/6**	**40/6**
Q-D 1/32	250	19/26	19/26	**286/–**	**53/–**
Q-D 1/42	500	19/26	19/26	**324/–**	**60/–**
Q-D 1/62	1000	19/26	19/26	**378/–**	**70/–**
Clearfit					
Q-KD 1/11	50	14/23	14/23	**202/6**	**37/6**
Q-KD 1/21	100	14/23	14/23	**213/6**	**39/6**
Q-KD 1/22	100	19/26	19/26	**245/6**	**45/6**
Q-KD 1/2/44	100	29/32	29/32	**270/-**	**50/–**
Q-KD 1/32	250	19/26	19/26	**305/–**	**56/6**
Q-KD 1/34	250	29/32	29/32	**316/–**	**58/6**
Q-KD 1/44	500	29/32	29/32	**335/–**	**62/–**
Q-KD 1/64	1000	29/32	29/32	**389/–**	**72/–**


Q-KD 1/22


Q-D 4/23


Q-KD 2/32

Cylindrical, with socket and plain stem.

List No.	Capacity ml	Socket	Cone	Six	Each
Quickfit					
Q-D 11/25	25	14/23	—	**154/–**	**28/6**
Q-D 11/50	50	14/23	—	**156/6**	**29/–**
Q-D 12/100	100	19/26	—	**162/–**	**30/–**
Q-D 12/250	250	19/26	—	**216/–**	**40/–**
Q-D 12/500	500	19/26	—	**237/6**	**44/–**
Q-D 12/1L	1000	19/26	—	**270/–**	**50/–**

Cylindrical, open top and cone.

List No.	Capacity ml	Socket	Cone	Six	Each
Quickfit					
Q-D 3/12	50	—	19/26	**224/–**	**41/6**
Q-D 3/22	100	—	19/26	**232/–**	**43/–**
Q-D 3/32	250	—	19/26	**248/6**	**46/–**

Cylindrical, with gas outlet tube.

List No.	Capacity ml	Socket	Cone	Six	Each
Quickfit					
Q-D 4/23	100	—	24/29	**305/–**	**56/6**

Pear shape, with socket and cone.

List No.	Capacity ml	Socket	Cone	Six	Each
Quickfit					
Q-D 2/01	25	14/23	14/23	**189/-**	**35/–**
Q-D 2/11	50	14/23	14/23	**191/6**	**35/6**
Q-D 2/12	50	19/26	19/26	**197/–**	**36/6**
Q-D 2/21	100	14/23	14/23	**197/–**	**36/6**
Q-D 2/22	100	19/26	19/26	**200/–**	**37/–**
Q-D 2/31	250	14/23	14/23	**232/–**	**43/–**
Q-D 2/32	250	19/26	19/26	**232/–**	**43/–**
Q-D 2/42	500	19/26	19/26	**237/6**	**44/–**
Q-D 2/62	1000	19/26	19/26	**362/–**	**67/–**
Clearfit					
Q-KD 2/11	50	14/23	14/23	**227/–**	**42/–**
Q-KD 2/21	100	14/23	14/23	**232/–**	**43/–**
Q-KD 2/22	100	19/26	19/26	**243/–**	**45/–**
Q-KD 2/31	250	14/23	14/23	**270/–**	**50/–**
Q-KD 2/32	250	19/26	19/26	**275/6**	**51/–**
Q-KD 2/42	500	19/26	19/26	**286/–**	**53/–**

All items on this page normally available from stock (code *m*).

FUNNELS

SEPARATING AND DROPPING FUNNELS (continued)

Pear shape, with socket and plain stem.

List No.	Capacity ml	Socket	Six	Each
Quickfit				
Q-D 22/50	50	19/26	**167/6**	**31/-**
Q-D 22/100	100	19/26	**173/-**	**32/-**
Q-D 22/250	250	19/26	**205/-**	**38/-**
Q-D 22/500	500	19/26	**221/6**	**41/-**
Q-D 22/1L	1000	19/26	**291/-**	**54/-**

Conical, with socket and short stem.

List No.	Capacity ml	Socket	Six	Each
Quickfit				
Q-D 82/100	100	19/26	**200/-**	**37/-**
Q-D 83/250	250	24/29	**259/-**	**48/-**
Q-D 83/500	500	24/29	**313/-**	**58/-**
Q-D 84/1L	1000	29/32	**340/-**	**63/-**

Plug type, stem with cone, 50 ml capacity.

List No.	Component	Socket	Cone	Six	Each
Quickfit					
Q-D 62/50	Funnel	10/19	19/26	**143/-**	**26/6**
Q-D 62/0	Plug	—	10/19	**44/6**	**8/3**

PRESSURE EQUALISATION FUNNELS

List No.	Type	Capacity ml	Socket	Cone	Six	Each
Quickfit						
Q-DE 100/22	Pear shape	100	19/26	19/26	**367/-**	**68/-**
Q-DE 250/33	Pear shape	250	24/29	24/29	**396/-**	**73/6**
Q-DEC 500/33	Cylindrical	500	24/29	24/29	**424/-**	**78/6**

INTERCHANGEABLE KEYS and retaining rings

List No.	Key bore	To fit	Retaining ring	Six	Each
Quickfit					
Q-D 5/1	1 mm	D 1/00, SC 10/1	—	**43/-**	**8/-**
Q-D 5/42	2 mm	DE, DEC, D funnels MF 11, MF 14 adapters SC 10/4, SC 10/42 stopcocks	D 5/4R	**50/-**	**9/3**
Q-D 5/4	4 mm	Ditto	D 5/4R	**50/-**	**9/3**
Q-D 5/4R	**Plastics retaining rings,** for above keys. In packs of six.			6 Packs **9/-**	Pack **3/1**

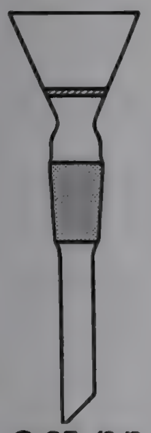
FILTER FUNNEL, with perforated plate, Hirsch type.

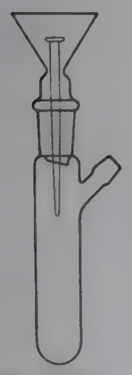
List No.	Disk dia.	Cone	Six	Each
Quickfit **Q-SF 42/2**	24 mm	19/26	**162/-**	**30/-**

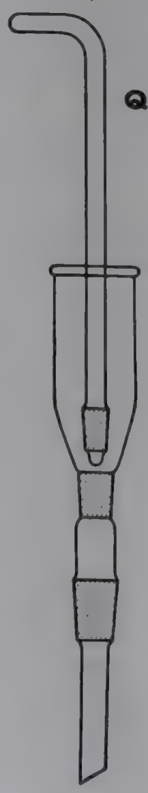
WILLSTATTER FILTER

The precipitate is retained on a small circle of filter paper (cut with a cork borer) supported on the glass 'nail'.

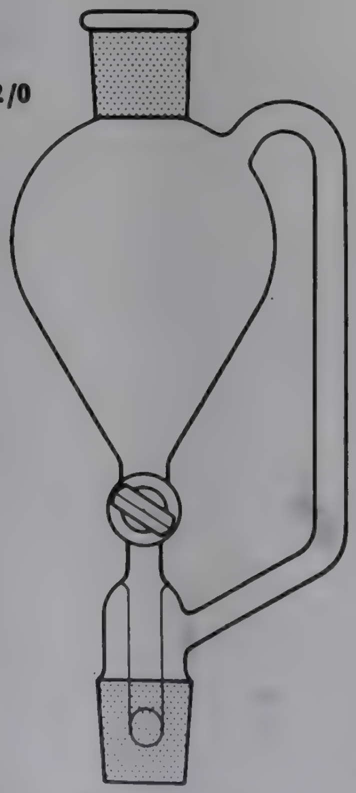
List No.	Description	Joint	Six	Each
Quickfit **Q-17 MU**	**Assembly**	10/19	**142/6**	**26/6**
			Doz.	Each
	Components			
Q-MU 39/10/0	Filter funnel	10/19	**140/-**	**13/-**
Q-MU/WN	Willstatter nail		**24/-**	**3/7**
Q-MD 60	Receiver tube	10/19	For price see entry on page 663	


Q-SF 42/2


Q-17MU



Q-D 62/50


Q-DE 250/33

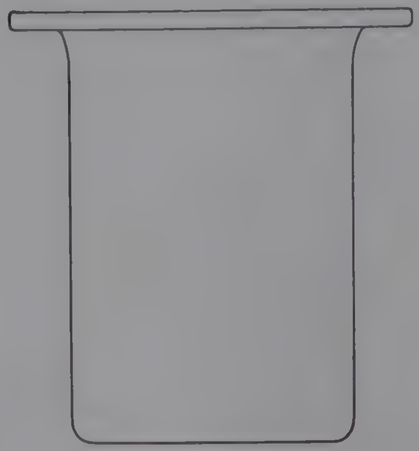
All items on this page normally available from stock (code *m*).

REACTION VESSELS

For explanation of flat flange sizes and additional information see page 645.

Flat bottom

List No.	Capacity ml	Flange i.d. mm	JR-260 clip to fit	Six	Each
Quickfit					
Q-FV 500	500	75	JC 75F	**264/6**	**49/–**
Q-FV 1L	1000	100	JC 100F	**275/6**	**51/–**

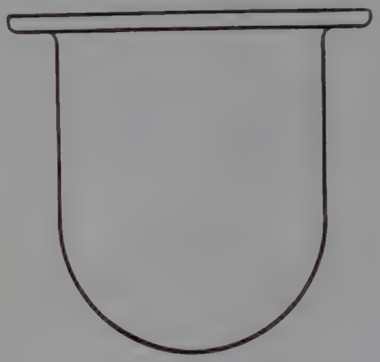

Q-FV 1L

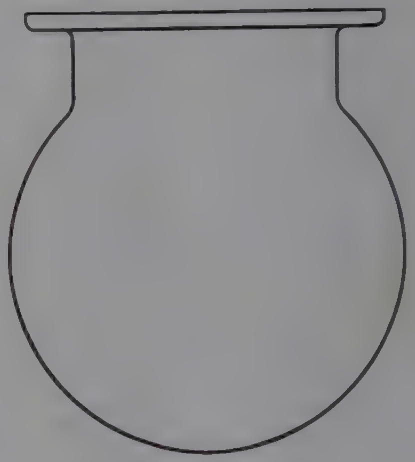
Round bottom

List No.	Capacity ml	Flange i.d. mm	JR-260 clip to fit	Six	Each
Quickfit					
Q-FR 100F	100	50	JC 50F	**178/–**	**33/–**
Q-FR 250F	250	75	JC 75F	**202/6**	**37/6**
Q-FR 500F	500	75	JC 75F	**227/–**	**42/–**
Q-FR 700F	700	100	JC 100F	**275/6**	**51/–**
Q-FR 1LF	1000	100	JC 100F	**275/6**	**51/–**
Q-FR 2LF	2000	100	JC 100F	**335/–**	**62/–**
Q-FR 5LF	5000	100	JC 100F	**453/6**	**84/–**
Q-FR 10LF	10,000	100	JC 100F	**475/–**	**88/–**
Q-FR 20LF	20,000	100	JC 100F	**831/6**	**154/–**

LIDS, for above vessels see flat flange adapters, page 645.

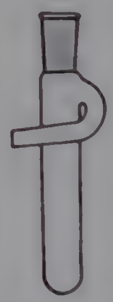
JR-260 Joint clips. For details and prices see entry in List No. sequence.

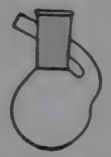

Q-FR 700F


Q-FR 2LF

RECEIVERS

List No.	Capacity approx.	Socket	Six	Each
Quickfit				
Q-MD 60	5 ml	10/19	**60/6**	**11/3**
Q-MD 61	10 ml	14/23	**55/6**	**10/3**
Q-MD 62	25 ml	14/23	**60/6**	**11/3**

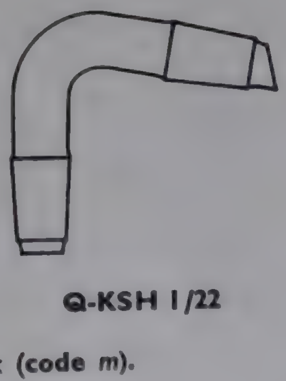

Q-MD 61


Q-MD 62

STILLHEADS

RECOVERY BENDS, sloping.

List No.	Flask cone	Condenser cone	Six	Each
Quickfit				
Q-SH 1/11	14/23	14/23	**44/6**	**8/3**
Q-SH 1/22	19/26	19/26	**54/–**	**10/–**
Q-SH 1/23	24/29	19/26	**74/–**	**13/9**
Q-SH 1/24	29/32	19/26	**83/6**	**15/6**
Q-SH 1/33	24/29	24/29	**67/6**	**12/6**
Q-SH 1/44	29/32	29/32	**93/–**	**17/3**
Clearfit				
Q-KSH 1/11	14/23	14/23	**81/–**	**15/–**
Q-KSH 1/22	19/26	19/26	**86/6**	**16/–**
Q-KSH 1/33	24/29	24/29	**102/6**	**19/–**


Q-KSH 1/22

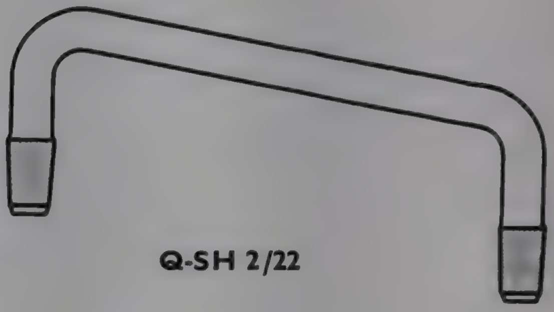
All items on this page normally available from stock (code *m*).

STILLHEADS

(continued)

RECOVERY BENDS, vertical.

List No.	Flask cone	Condenser cone	Six	Each
Quickfit				
Q-SH 2/11	14/23	14/23	**67/6**	**12/6**
Q-SH 2/22	19/26	19/26	**77/–**	**14/3**
Q-SH 2/23	24/29	19/26	**96/–**	**17/9**
Q-SH 2/33	24/29	24/29	**98/6**	**18/3**

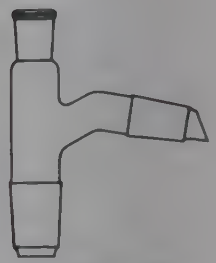


Q-SH 2/22

RECOVERY HEADS

With 14/23 thermometer socket (except Q-SH 4/0, which has 10/19).

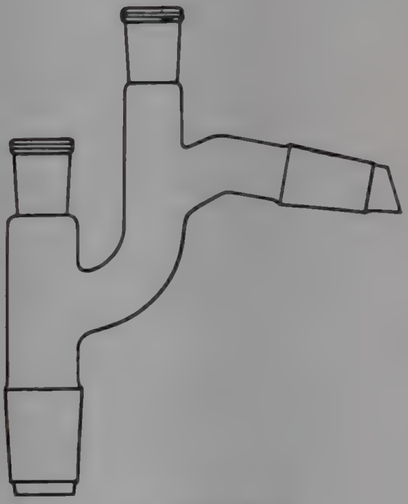
List No.	Flask cone	Condenser cone	Six	Each
Quickfit				
Q-SH 4/0	10/19	10/19	**79/6**	**14/9**
Q-SH 4/11	14/23	14/23	**83/6**	**15/6**
Q-SH 4/2	19/26	19/26	**101/–**	**18/9**
Q-SH 4/22	19/26	19/26	**86/6**	**16/–**
Q-SH 4/23	24/29	19/26	**89/–**	**16/6**
Q-SH 4/24	29/32	19/26	**94/6**	**17/6**
Q-SH 4/25	34/35	19/26	**108/–**	**20/–**
Q-SH 4/33	24/29	24/29	**96/–**	**17/9**
Q-SH 4/35	34/35	24/29	**119/–**	**22/–**
Q-SH 4/55	34/35	34/35	**154/–**	**28/6**
Clearfit, with 14/23 socket (except Q-KSH 4/2 and Q-KSH 4/4 which have 19/26 and 29/32 respectively.)				
Q-KSH 4/1	14/23	14/23	**119/–**	**22/–**
Q-KSH 4/22	19/26	19/26	**121/6**	**22/6**
Q-KSH 4/2	19/26	19/26	**135/–**	**25/–**
Q-KSH 4/33	24/29	24/29	**119/–**	**22/–**
Q-KSH 4/4	29/32	29/32	**151/–**	**28/–**



Q-KSH 4/22

CLAISEN STILLHEADS, sloping.

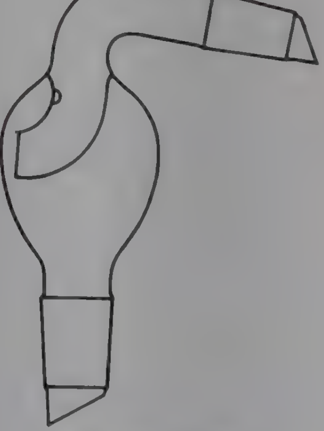
List No.	Flask cone	Condenser cone	Sockets	Six	Each
Quickfit					
Q-SH 6/11	14/23	14/23	14/23	**137/6**	**25/6**
Q-SH 6/22	19/26	19/26	14/23	**141/6**	**26/3**
Q-SH 6/23	24/29	19/26	14/23	**146/–**	**27/–**
Q-SH 6/25	34/35	19/26	14/23	**162/–**	**30/–**
Q-SH 6/33	24/29	24/29	14/23	**162/–**	**30/–**
Q-SH 6/44	29/32	29/32	14/23	**186/6**	**34/6**
Clearfit					
Q-KSH 6/1	14/23	14/23	14/23	**162/–**	**30/–**
Q-KSH 6/22	19/26	19/26	14/23	**173/–**	**32/–**
Q-KSH 6/33	24/29	24/29	14/23	**189/–**	**35/–**



Q-KSH 6/22

SPLASH HEADS, pear shape, sloping.

List No.	Cone fitting flask or column	Cone fitting condenser	Six	Each
Quickfit				
Q-SH 7/02	19/26	19/26	**167/6**	**31/–**
Q-SH 7/03	24/29	19/26	**164/6**	**30/6**
Q-SH 7/05	34/35	19/26	**183/6**	**34/–**
Clearfit				
Q-KSH 7/02	19/26	19/26	**175/6**	**32/6**
Q-KSH 7/43	24/29	24/29	**197/–**	**36/6**
Q-KSH 7/0/44	29/32	29/32	**210/6**	**39/–**



Q-KSH 7/43

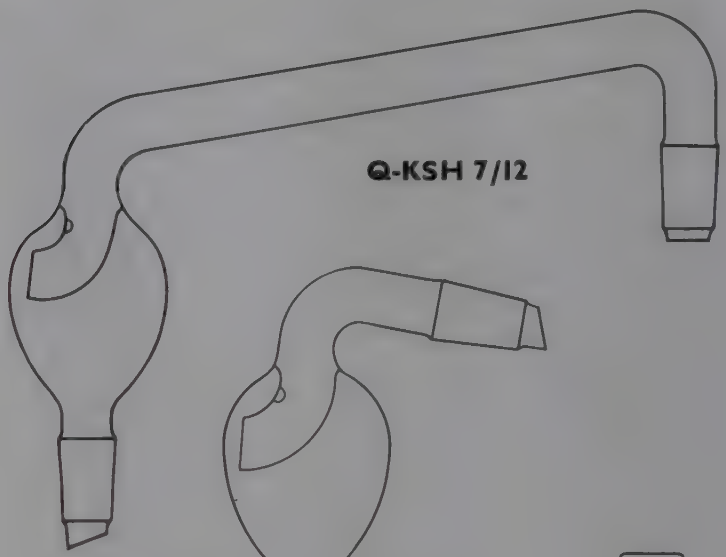
All items on this page normally available from stock (code *m*).

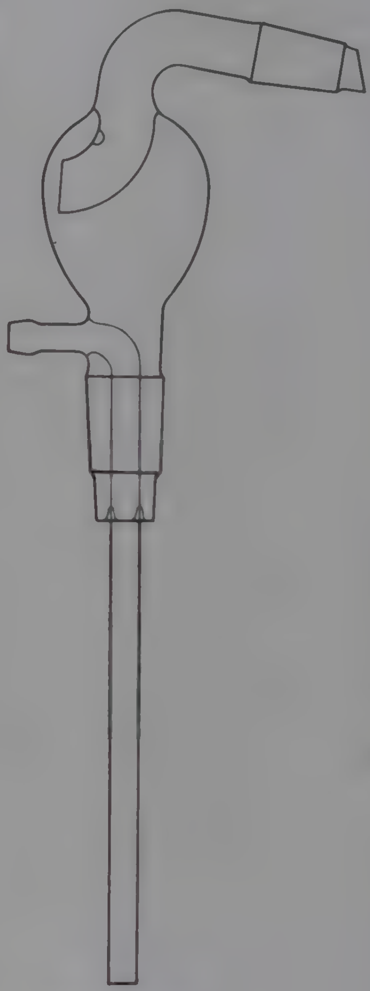
STILLHEADS

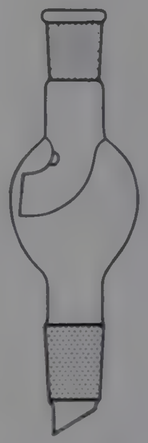
(continued)

SPLASH HEADS, pear shape, vertical.

List No.	Cone fitting flask or column	Cone fitting condenser	Six	Each
Quickfit				
Q-SH 7/12	19/26	19/26	**181/–**	**33/6**
Q-SH 7/13	24/29	19/26	**178/–**	**33/–**
Q-SH 7/53	24/29	24/29	**210/6**	**39/–**
Clearfit				
Q-KSH 7/12	19/26	19/26	**191/6**	**35/6**
Q-KSH 7/53	24/29	24/29	**229/6**	**42/6**


Q-KSH 7/12


Q-KSH 7/63

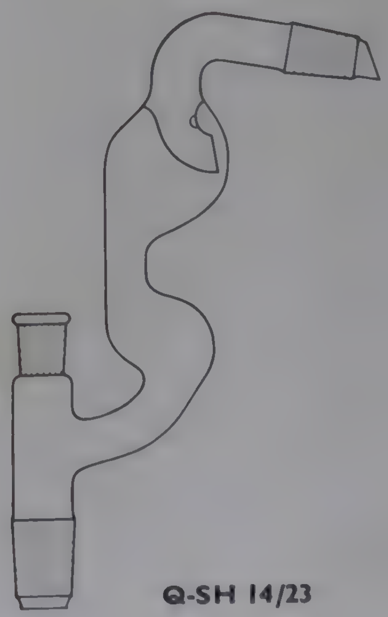

Q-SH17/23

STEAM DISTILLATION HEADS, pear shape, sloping.

List No.	Cone fitting flask or column	Cone fitting condenser	Six	Each
Quickfit				
Q-SH 7/23	24/29	19/26	**227/–**	**42/–**
Clearfit				
Q-KSH 7/63	24/29	24/29	**232/–**	**43/–**

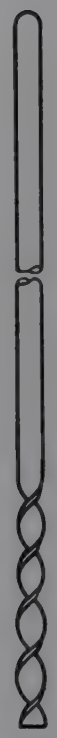
SPLASH HEADS

List No.	Description	Cone fitting flask or column	Cone fitting condenser	Six	Each
Quickfit					
Q-SH 14/23	Splash head, double bulb, sloping, with 14/23 socket ...	24/29	19/26	**302/6**	**56/–**
Q-SH 17/23	Splash head adapter	Socket 19/26	Cone 24/29	**146/–**	**27/–**

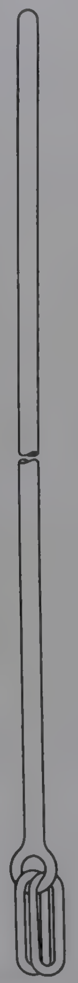

Q-SH 14/23

All items on this page normally available from stock (code *m*).

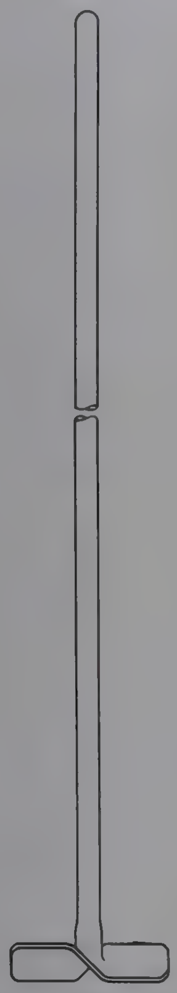
STIRRERS



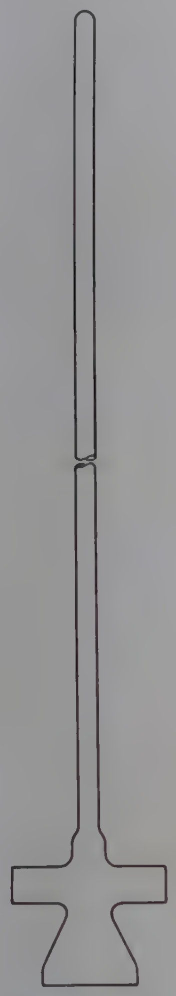
Q-ST 1/0



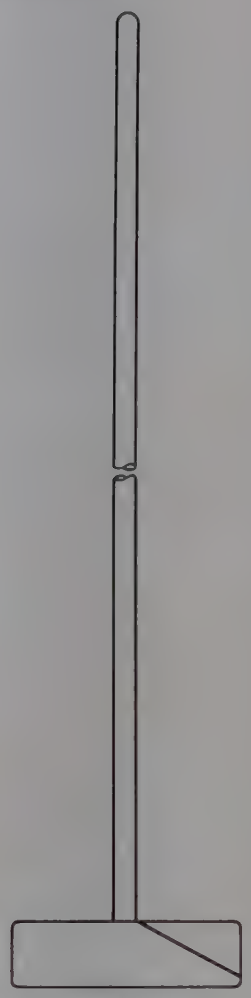
Q-ST 1/1
Q-ST 1/24



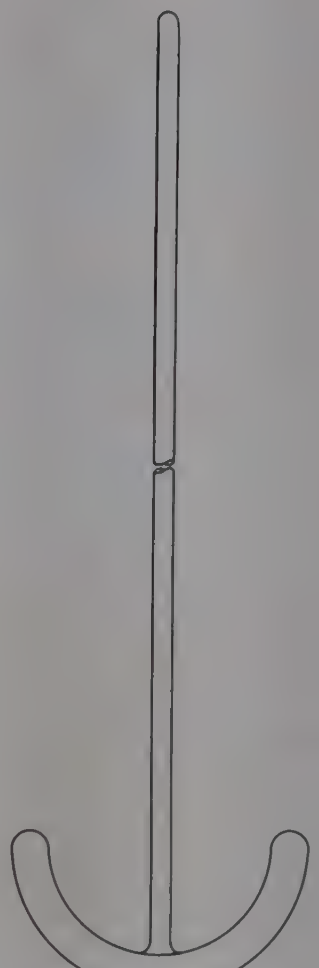
Q-ST 1/2
Q-ST 11/2



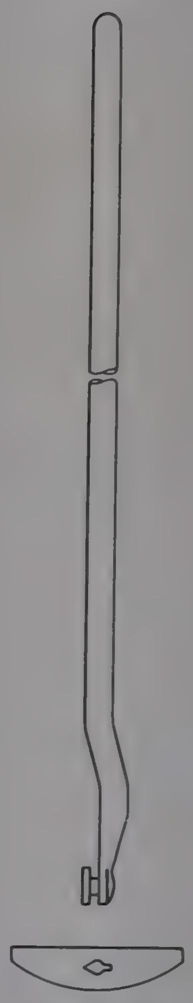
Q-ST 1/3
Q-ST 11/3



Q-ST 1/4



Q-ST 1/05
to
Q-ST 1/8



Q-ST 6/7
with
Q-ST 7/3

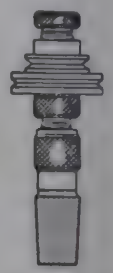
List No.	Description	Shaft		Blade dia. (extended) mm	Minimum socket to pass	Suitable for reaction vessel	Six	Each
		Dia. mm	Length mm					
Quickfit								
Q-ST 1/0	Screw type	5	210	—	10/19	—	**51/6**	**9/6**
Q-ST 1/1	Link	6	450	75	24/29	—	**59/6**	**11/–**
Q-ST 1/24	Link	6	600	75	24/29	—	**67/6**	**12/6**
Q-ST 1/4	Collapsible paddle	6	450	70	24/29	—	**127/–**	**23/6**
Q-ST 1/2	Fixed paddle	6	600	50	55/44	—	**75/6**	**14/–**
Q-ST 11/2	Fixed paddle	11	750	80	100 mm	1 – 5 l	**121/6**	**22/6**
Q-ST 1/3	Centrifugal	6	600	50	55/44	—	**119/–**	**22/–**
Q-ST 11/3	Centrifugal	11	750	92	100 mm	1 –20 l	**151/–**	**28/–**
Q-ST 1/05	Anchor	5	210	45	50 mm	50–100 ml	**52/6**	**9/9**
Q-ST 1/5	Anchor	6	450	95	100 mm	700 ml–2 l	**94/6**	**17/6**
Q-ST 1/6	Anchor	6	600	137	100 mm	2 – 5 l	**97/–**	**18/–**
Q-ST 1/8	Anchor	11	750	137	100 mm	10 –20 l	**108/–**	**20/–**
Q-ST 6/7	Shaft for Q-ST 7/2 and Q-ST 7/3	6	450	—	—	—	**82/6**	**15/3**
Q-ST 7/2	Detachable PTFE blade	—	—	52	19/26	¼ – 1 l	**24/6**	**5/4**
Q-ST 7/3	Detachable PTFE blade	—	—	76	24/29	1 – 3 l	**48/6**	**9/–**
Q-ST 11/5	Shaft for Q-ST 7/3L	11	450	—	—	—	**121/6**	**22/6**
Q-ST 7/3L	Detachable PTFE blade	—	—	76	24/29	1 – 3 l	**54/–**	**10/–**

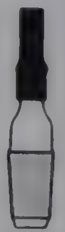
All items on this page normally available from stock (code *m*).

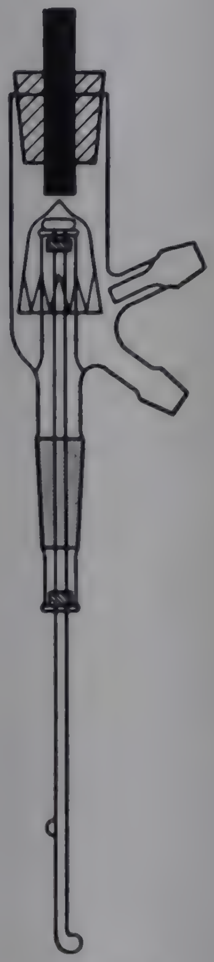
STIRRERS

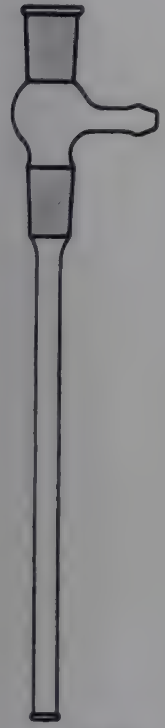
SEMI-MICRO STIRRER, TURBINE TYPE, with glass shaft. The stirrer unit has a 10/19 cone suitable for fitting directly to a suitable test tube or semi-micro reaction flask. It can be driven by compressed air, water or vacuum whichever is the most convenient for the job in hand.

List No.	Shaft dia.	Shaft length	Dozen	Each
Quickfit **Q-MU 8/0**	2 mm	90 mm	886/–	82/–


Q-ST 4/2

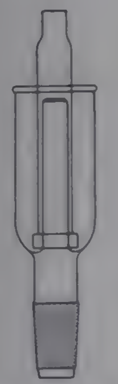

Q-ST 5/2

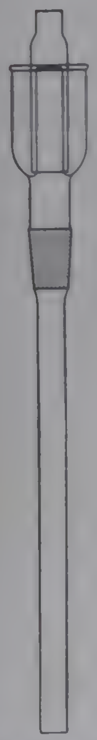

Q-MU 8/0

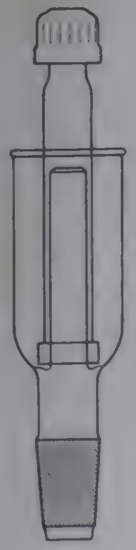

Q-ST 2/2

STIRRER GUIDES AND GLANDS

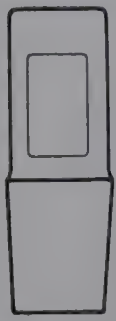
List No.	Description	Shaft dia. mm	Cone	Six	Each
Quickfit					
Q-ST 2/2	Stirrer guide with 19/26 socket ...	6	19/26	104/–	19/3
Q-ST 2/33C	Stirrer guide with 24/29 socket ...	11	24/29	154/–	28/6
	Stirrer glands with stuffing box				
Q-ST 3/2F	PTFE without pulley	6	19/26	432/–	80/–
Q-ST 4/2	Brass with pulley	6	19/26	356/6	66/–
Q-ST 4/2F	PTFE with pulley	6	19/26	486/–	90/–
Q-ST 4R	O-rings for Q-ST 4/2 and Q-ST 4/2F	6	—	Pack of 12	5/–
Q-ST 4W	Felt washers for stuffing box ...	6	—	Pack of 12	2/6
	Stirrer glands for rubber sleeve				
Q-ST 5/1	Cone 14/23	6	14/23	56/6	10/6
Q-ST 5/2	Cone 19/26	6	19/26	58/–	10/9
Q-ST 5/3	Cone 24/29	6	24/29	59/6	11/–
	Stirrer glands with mercury seal and guide				
Q-ST 8/2	Rubber fitting	6	19/26	132/6	24/6
Q-ST 18/2	Screw cap fitting	6	19/26	189/–	35/–
Q-ST 8/2T	Spare screw cap with ring and washer	6	—	66/–	12/3
	Stirrer glands with ground sleeve				
Q-ST 10/2	Rubber fitting	6	19/26	281/–	52/–
Q-ST 20/2	Screw cap fitting, thread size 13 ...	6	19/26	281/–	52/–
Q-ST 20/3	Screw cap fitting, thread size 24 ...	11	24/29	388/6	72/–
Q-ST 20/4	Screw cap fitting, thread size 24 ...	11	29/32	399/6	74/–
Q-ST 10/2T	Spare ground sleeve screw cap with ring and washer	6	—	135/–	25/–
Q-ST 10/34T	Spare ground sleeve screw cap with ring and washer	11	—	178/–	33/–
Q-ST 10P	Drive pulley for ground sleeve glands	6 and 11	—	356/6	66/–
Clearfit					
Q-KST 2/2	Stirrer guide with 19/26 socket ...	6	19/26	129/6	24/–
Q-KST 2/33/7	Stirrer guide with 24/29 socket ...	6	24/29	143/–	26/6
Q-KST 2/44/7	Stirrer guide with 29/32 socket ...	6	29/32	173/–	32/–
Q-KST 2/44C	Stirrer guide with 29/32 socket ...	11	29/32	227/–	42/–
	Stirrer glands with screw cap				
Q-KST 20/2	Thread size 13	6	19/26	281/–	52/–
Q-KST 20/3/6	Thread size 13	6	24/29	292/–	53/–
Q-KST 20/4/6	Thread size 13	6	29/32	295/–	53/6
Q-KST 20/3	Thread size 24	11	24/29	389/–	72/–
Q-KST 20/4	Thread size 24	11	29/32	399/–	74/–

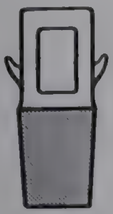

Q-ST 10/2

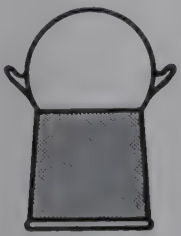

Q-ST 8/2

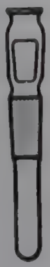

Q-ST 20/2

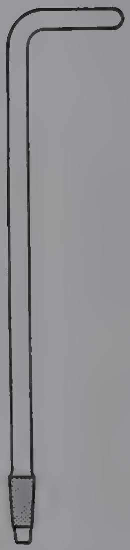
All items on this page normally available from stock (code *m*).

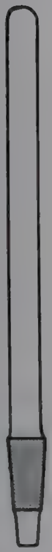

Q-KSB 19

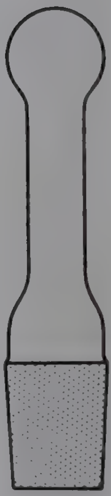

Q-SB 14H

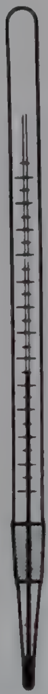

Q-MF 12/3

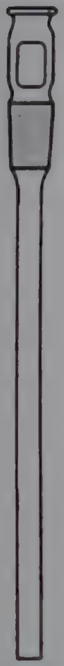

Q-SH 4A


Q-D 62/0


Q-FC 16B


Q-SIB 24


Q-MF 31/2


Q-MF 16/2

THERMOMETERS

List No.	Cone	Range	Six	Each
Quickfit				
Q-MF 31/0/110	10/19	−10 to 110°C	**254/–**	**47/–**
Q-MF 31/0/250	10/19	0 to 250°C	**270/–**	**50/–**
Q-MF 31/0/360	10/19	0 to 360°C	**286/–**	**53/–**
Q-MF 31/1	14/23	−10 to 110°C	**254/–**	**47/–**
Q-MF 31/2	14/23	0 to 250°C	**264/6**	**49/–**
Q-MF 31/3	14/23	0 to 360°C	**275/6**	**51/–**
Q-MU 31/3	—	0 to 360°C	**194/–**	**18/–**

THERMOMETER POCKETS

Long type for sealing to length required.

List No.	Cone	Stem length mm	Dozen	Each
Quickfit				
Q-MF 16/1	14/23	200	**108/–**	**10/–**
Q-MF 16/2	19/26	200	**113/–**	**10/6**

STOPPERS AND CAPS

STOPPERS, closed ends.

List No.	Cone	Dozen	Each
Quickfit			
Q-SB 7	7/16	**103/–**	**9/6**
Q-SB 10	10/19	**46/–**	**5/2**
Q-SB 12	12/21	**46/–**	**5/2**
Q-SB 14	19/28	**41/–**	**4/10**
Q-SB 19	19/26	**49/–**	**5/6**
Q-SB 24	24/29	**51/–**	**5/8**
Q-SB 29	29/32	**58/–**	**6/2**
Q-SB 34	34/35	**70/–**	**7/–**
Q-SB 40	40/38	**108/–**	**10/–**
Clearfit		Six	Each
Q-KSB 14	14/23	**38/–**	**7/4**
Q-KSB 19	19/26	**43/–**	**8/–**
Q-KSB 24	24/29	**47/–**	**8/9**
Q-KSB 29	29/32	**52/–**	**9/3**

STOPPERS, closed ends with hooks.

List No.	Cone	Dozen	Each
Quickfit			
Q-SB 14H	14/23	**65/–**	**6/8**
Q-SB 19H	19/26	**70/–**	**7/–**

CAPS, with hooks.

List No.	Socket	Dozen	Each
Quickfit			
Q-MF 12/2	19/26	**76/–**	**7/6**
Q-MF 12/3	24/29	**86/–**	**8/3**

STOPPERS, long handle.

List No.	Cone	Purpose	Six	Each
Quickfit				
Q-D 62/0	10/19	Dropping funnel, bent	For price see entry on page 662	
Q-FC 16B	10/19	Dropping funnel, straight	**32/6**	**6/6**
Q-SIB 24	24/29	Iodine flask	**65/–**	**12/–**

THERMOMETER POCKET

To fit all standard stillheads.

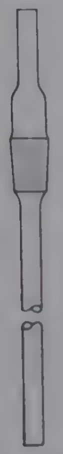
List No.	Cone	Stem length mm	Six	Each
Quickfit				
Q-SH 4A	14/23	45	**54/–**	**10/–**

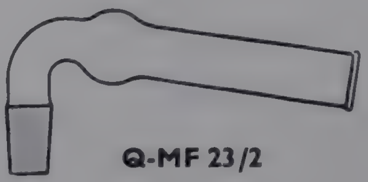
All items on this page normally available from stock (code *m*).

TUBES

AIR LEAK OR GAS ENTRY TUBES, straight.

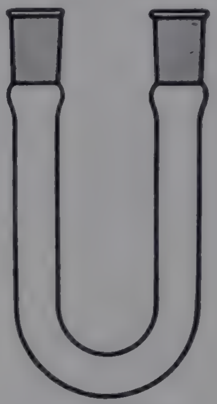
List No.	Socket	Cone	Stem length mm	Dozen	Each
Quickfit					
Q-MU 9/00	10/19	10/19	—	**151/–**	**14/–**
Q-MF 15/0	—	10/19	100	**97/–**	**9/–**
Q-MF 15/1	—	14/23	150	**97/–**	**9/–**
Q-MF 15/2	—	19/26	150	**105/–**	**9/9**
Q-MF 15/3	—	24/29	150	**119/–**	**11/–**

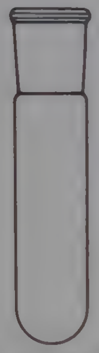

Q-MF 15/1

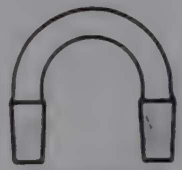

Q-MF 23/2

DRYING TUBES

List No.	Type	Cone	Six	Each
Quickfit				
Q-MU 23/0	Straight	10/19	**36/6**	**7/2**
Q-MF 23/0	Angled	10/19	**59/6**	**11/–**
Q-MF 23/1	Angled	14/23	**62/–**	**11/6**
Q-MF 23/2	Angled	19/26	**71/6**	**13/3**
Q-MF 23/3	Angled	24/29	**78/6**	**14/6**
Clearfit				
Q-KMF 23/2	Angled	19/26	**78/6**	**14/6**
Q-KMF 23/3	Angled	24/29	**89/–**	**16/6**


Q-MF 21/2


Q-KMF 24/2


Q-MF 22/2

TEST TUBES

List No.	Socket	Overall length mm	Stopper to fit	Dozen	Each
Quickfit					
Q-MF 24/0	10/19	65	SB 10	**57/–**	**6/–**
Q-MF 24/0/4	10/19	100	SB 10	**59/–**	**6/2**
Q-MF 24/12/4	12/21	100	SB 12	**59/–**	**6/2**
Q-MF 24/1	14/23	100	SB 14	**54/–**	**5/10**
Q-MF 24/1/5	14/23	125	SB 14	**57/–**	**6/–**
Q-MF 24/1/6	14/22	150	SB 14	**59/–**	**6/2**
Q-MF 24/2	19/26	100	SB 19	**67/–**	**6/10**
Q-MF 24/2/6	19/26	150	SB 19	**70/–**	**7/–**
Q-MF 24/3	24/29	150	SB 24	**73/–**	**7/4**
Q-MF 24/3/8	24/29	200	SB 24	**78/–**	**7/8**
Q-MF 24/5	34/35	250	SB 34	**100/–**	**9/3**
				Six	Each
Clearfit					
Q-KMF 24/1	14/23	100	KSB 14	**39/–**	**7/6**
Q-KMF 24/1/5	14/23	125	KSB 14	**40/6**	**7/8**
Q-KMF 24/1/6	14/23	150	KSB 14	**42/–**	**7/11**
Q-KMF 24/2	19/26	100	KSB 19	**44/6**	**8/3**
Q-KMF 24/2/6	19/26	150	KSB 19	**44/6**	**8/3**
Q-KMF 24/3	24/29	150	KSB 24	**47/–**	**8/9**
Q-KMF 24/3/8	24/29	200	KSB 24	**48/6**	**9/–**

U-TUBES

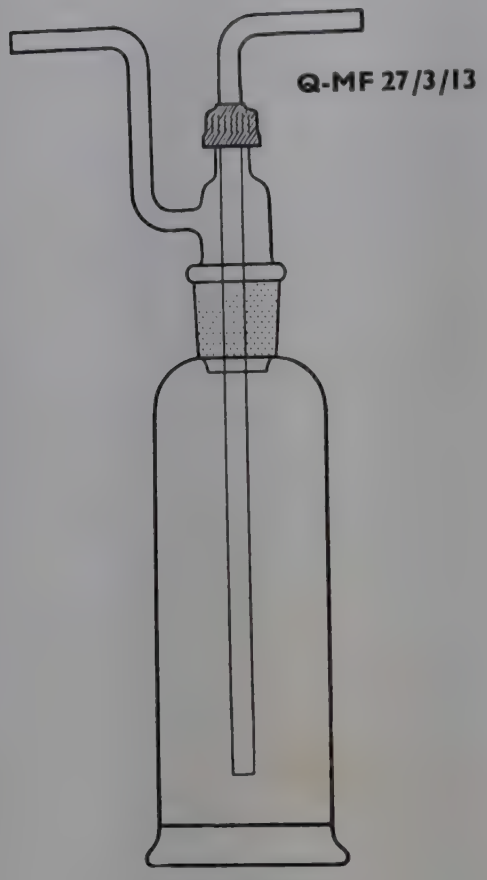
List No.	Type	Sockets	Cones	Six	Each
Quickfit					
Q-MF 21/2	2 Sockets	19/26	—	**97/–**	**18/–**
Q-MF 22/2	2 Cones	—	19/26	**59/6**	**11/–**

DOUBLE SPRING CLIPS, chromium plated steel double ended clips of which one end fits the normal $\frac{1}{2}$ in (13 mm) retort or scaffold rod. The other end takes glassware of sizes as shown.

List No.	To hold tube size mm	Dozen	Each
Quickfit			
Q-MF 40/13/10	9–12	**22/–**	**3/5**
Q-MF 40/13/19	18–22	**22/–**	**3/5**
Q-MF 40/13/24	24–28	**24/–**	**3/7**

All items on this page normally available from stock (code *m*).

WASHBOTTLES


Q-MF 27/3/13

Q-MF 29/3/250

WASH BOTTLE HEADS for use with standard flasks.

List No.	Cone	For flasks	Six	Each
Quickfit				
Q-MF 25/3	24/29	FE 500/3	**87/6**	**16/3**
Q-MF 25/3L	24/29	FF IL/3M	**87/6**	**16/3**

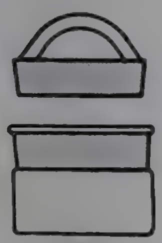
WASH BOTTLE HEAD, DRECHSEL, adjustable.
A screw thread joint allows easy adjustment of the dip tube so that the head can be used with various sizes of Drechsel bottle. The dip tube is replaceable.

List No.	To fit bottles	Cone	Thread	Six	Each
Quickfit					
Q-MF 27/3/13	Q-MF 29/3/125 Q-MF 29/3/250	24/29	13	**129/6**	**24/–**

GAS WASH BOTTLES, DRECHSEL

List No.	Description	For use with	Cone	Six	Each
Quickfit					
Q-MF 28/2	Head	—	19/26	**97/–**	**18/–**
Q-MF 28/3/125	Head	MF 29/3/125	24/29	**87/6**	**16/3**
Q-MF 28/3/250	Head	MF 29/3/250	24/29	**90/6**	**16/9**
Q-MF 28/3/500	Head	MF 29/3/500	24/29	**92/–**	**17/–**
Q-MF 29/3/125	Bottle 125 ml	MF 28/3/125	24/29	**78/6**	**14/6**
Q-MF 29/3/250	Bottle 250 ml	MF 28/3/250	24/29	**86/6**	**16/–**
Q-MF 29/3/500	Bottle 500 ml	MF 28/3/500	24/29	**110/6**	**20/6**

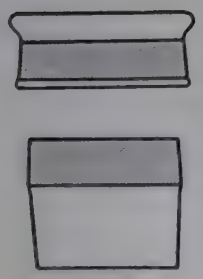
Q-WB 10
Q-WB 11


Q-WB 40
Q-WB 43

Ⓐ Drechsel bottles with plain or fritted distributor tubes see GAS WASHBOTTLES

WEIGHING AND DROPPING BOTTLES

List No.	Description	Socket	Cone	Maximum weight	Six	Each
Quickfit						
Q-WB 10	Weighing bottle lid	—	24/10	5 g	**40/6**	**7/8**
Q-WB 11	Weighing bottle base	24/10	—	15 ,,	**46/–**	**8/6**
Q-WB 40	Weighing bottle lid	—	40/13	10 ,,	**47/–**	**8/9**
Q-WB 43	Weighing bottle base	40/13	—	20 ,,	**54/–**	**10/–**
Q-WB 50L	Weighing bottle lid	50/14	—	25 ,,	**75/6**	**14/–**
Q-WB 50B	Weighing bottle base	—	50/14	30 ,,	**59/6**	**11/–**
				Capacity		
Q-MF 33A	Dropping bottle	—	19/17	25 ml	**66/–**	**12/3**
Q-MF 33B	Pipette	19/17	—	—	**87/6**	**16/3**
Q-MF 33C	Rubber teat	—	—	—	Pack of 12	**4/–**


Q-WB 50L
Q-WB-50B

Q-MF 33A/B/C

All items on this page normally available from stock (code *m*).

QUICKFIT ASSEMBLIES

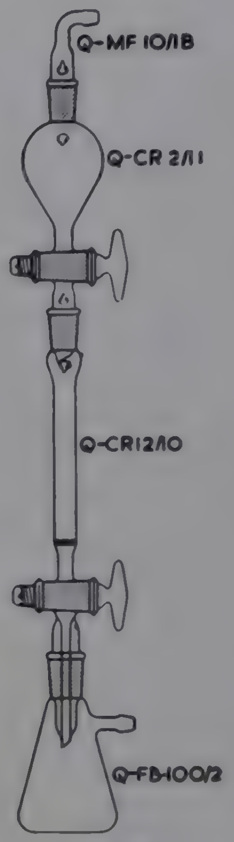
CHROMATOGRAPHY

The *Quickfit* range of chromatographic adsorption apparatus includes semi-micro columns, 1 cm diameter, and laboratory preparation columns, 2 and 5 cm diameter, in varying lengths. The adsorption material is supported on a fritted glass disk, porosity grade 0. Fittings are provided for use of the columns under vacuum or positive pressure, and suitable solvent reservoirs may conveniently be fitted by means of which it is possible to run the column under positive pressure for a considerable time without refilling.

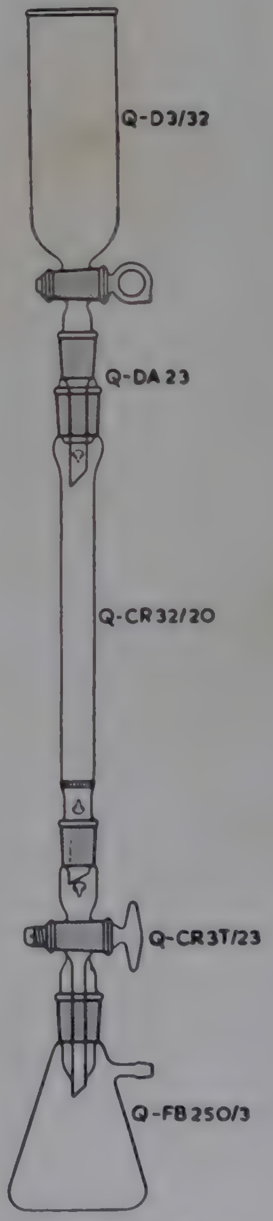
List No.	Description	Socket	Cone	Six	Each
Q-1 CR	**Assembly**	—	—	**1014/-**	**187/8**
Q-2 CR	**Assembly**	—	—	**1074/-**	**199/-**
	Components				
Q-CR 12/10	Semi-micro column with tap, 10 cm effective length, 10 mm bore	14/23	19/26	**475/-**	**88/-**
Q-CR 12/30	Ditto, 30 cm effective length, 10 mm bore ...	14/23	19/26	**505/-**	**93/6**
Q-CR 32/20	Laboratory preparation column, 20 cm effective length, 18 mm bore ...	24/29	19/26	**194/6**	**36/-**
Q-CR 32/30	Ditto, 30 cm effective length, 18 mm bore ...	24/29	19/26	**202/6**	**37/6**
Q-CR 32/40	Ditto, 40 cm effective length, 18 mm bore ...	24/29	19/26	**227/-**	**42/-**
Q-CR 2/11	Reservoir, 50 ml ...	14/23	14/23	**343/-**	**63/6**
Q-CR 41/42	Tamping rod for Q-CR 12/10 and Q-CR 12/30	—	—	**29/6**	**6/2**
Q-CR 43/53	Tamping rod for Q-CR 32/20, 30 and 40	—	—	**54/-**	**10/-**
Q-CR 3T/23	Tap adapter	19/26	24/29	For prices see entries on pages stated	Page 646
Q-D 3/32	Reservoir, 250 ml ...	—	19/26		661
Q-DA 23	Reduction adapter ...	19/26	24/29		639
Q-FB 100/2	Buchner flask, 100 ml	19/26	—		658
Q-FB 250/3	,, ,, 250 ml	24/29	—		658
Q-FB 500/3	,, ,, 500 ml	24/29	—		658
Q-FB 1L/3	,, ,, 1 litre	24/29	—		658
Q-MF 10/1B	Cone adapter... ...	—	14/23		646
JR-140	Spring, 38 mm, MF 40A	—	—		440
JR-140	,, 50 mm, MF 40B	—	—		440

For suitable column packings see CL-260 to CL-284 in List No. sequence.

Ⓐ **Chromatography columns and other chromatographic apparatus see CHROMATOGRAPHY.**



Q-1CR
(Also includes Q-CR 41/42 and 4 × JR-140, MF 40A)



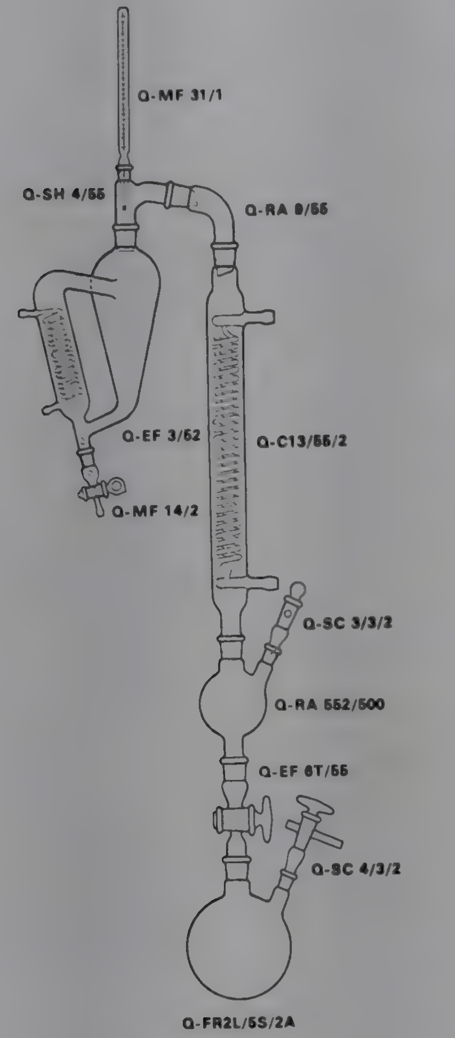
Q-2CR
(Also includes Q-CR 43/53)

All items on this page normally available from stock (code *m*).

EVAPORATORS

CIRCULATORY CYCLONE EVAPORATOR

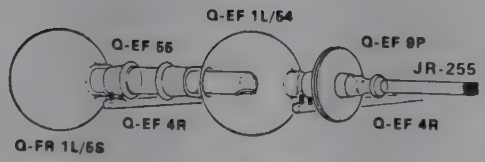
List No.	Description	Cone	Socket	Two	Each
Quickfit **Q-20 EF**	**Assembly**	—	—	**1660/–**	**922/6**
				Six	Each
	Components				
Q-EF 3/52	Steam-heated cyclone evaporator. Coil surface 900 cm² (1 ft²) ...	19/26	34/35	**1188/–**	**220/–**
Q-C 13/55/2	Coil condenser, surface area 0·2 m² (2 ft²)	34/35	34/35	For prices see entries on pages stated	Page 648
Q-EF 6T/55	Stopcock adapter	34/35	34/35		646
Q-FR 2L/5S/2A	2× Receiver flasks, 2 litre ...	—	34/35 and 19/26		654
Q-MF 14/2	Feed control stopcock	—	19/26		646
Q-MF 31/1	Thermometer, —10°C to 110°C	14/23	—		668
JR-140	2× Stainless steel springs, MF 40A	—	—		440
Q-RA 9/55	Receiver adapter	34/35	34/35		641
Q-RA 552/500	Intermediate receiver adapter 500 ml	34/35	34/35 and 19/26		654
Q-SC 3/3/2	Vacuum control stopcock ...	19/26	—		646
Q-SC 4/3/2	Vacuum release stopcock ...	19/26	—		646
Q-SH 4/55	Stillhead	34/35	14/23		664



Q-20 EF

ROTARY FILM EVAPORATOR

List No.	Description	Socket/Cup	Cone/Ball	Six	Each
Quickfit **Q-ILVE**	**Assembly**	—	—	**790/6**	**146/6**
	Components				
Q-EF 55	Double cone adapter	—	34/35	**164/6**	**30/6**
Q-EF IL/54	Receiver flask, 1 litre	34/35	24/29, S19	**262/–**	**48/6**
Q-EF 9P	Pulley wheel ...	—	—	**54/–**	**10/–**
Q-EF 4R	2× Rollers	—	—	**89/–**	**16/6**
Q-FR IL/5S	Boiling flask, 1 litre	34/35	—	For prices see entries on pages stated	Page 652
JR-255	Vacuum tube ...	FS19	—		440



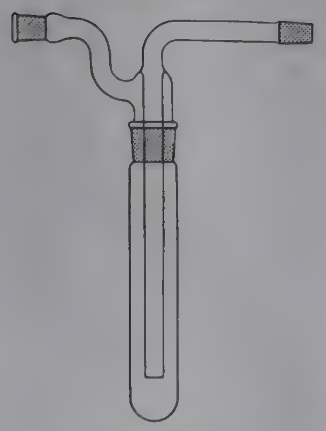
Q-ILVE

COLD TRAP

For vacuum systems. May also be used as a Kjeldahl absorption trap.

List No.	Description	Socket	Cone	Six	Each
Quickfit **Q-MF 24/5**	Trap body 250 mm ...	34/35	—	For price see entry on page 669	
Q-MF 28/52	Trap head	19/26	34/35 and 19/26	**237/6**	**44/–**

Q-MF 28/52



Q-MF 24/5

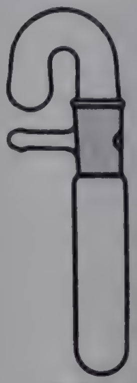
All items on this page normally available from stock (code *m*).

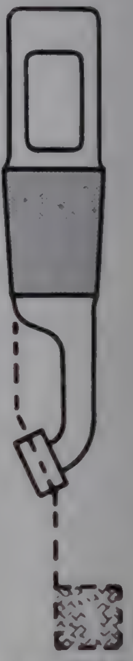
THUNBERG TUBES

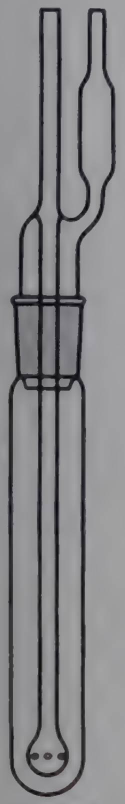
List No.	Description	Approx. capacity ml	Socket	Cone	Six	Each
Quickfit						
Q-BC 31/1	Thunberg stopper	2	—	14/23	**65/–**	**12/–**
Q-BC 32/1	Thunberg tube	6	14/23	—	**92/–**	**17/–**
Q-BC 31	Thunberg stopper	2	—	19/26	**66/–**	**12/3**
Q-BC 32	Thunberg tube	20	19/26	—	**86/6**	**16/–**

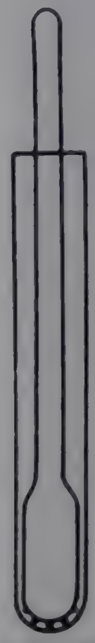
BLOOD UREA APPARATUS, LEURQUIN

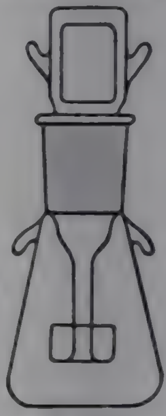
List No.	Description	Approx. capacity ml	Socket	Cone	Six	Each
Quickfit **Q-11MC**	**Assembly** ...	—	—	—	**531/–**	**98/3**
	Components					
Q-BC 11	Blood urea apparatus head	—	—	24/29	**122/6**	**22/6**
Q-MF 24/3/8	Blood urea apparatus tube	70	24/29	—	For price see entry on page 669.	
JR-010	Cone (CNB 10)	See entry in List No. sequence.				
Q-MC 11P	Aeration head	—	10/19	24/29	**308/–**	**57/–**

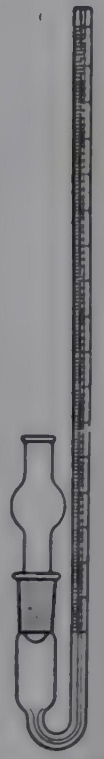

Q-BC 31
Q-BC 32


Q-SB 24/S


Q-BC 11
Q-MF24/3/8


Q-BC 15P
Q-BC 15/150


Q-2BC


Q-WE 12/1
Q-SB 14DL

HOMOGENISER

This homogeniser is suitable for breaking down tissues in small scale work.

List No.	Description	Diameter mm	Six	Each
Quickfit				
Q-BC 15P	Plunger ...	15	**113/6**	**21/–**
Q-BC 15/150	Tube ...	15	**44/6**	**8/3**

CAVETT FLASK

List No.	Description	Six	Each
Quickfit **Q-2BC**	**Assembly**	**156/–**	**28/9**
	Components		
Q-BC 3CH	Special 24/29 stopper with hooks and cup...	**89/–**	**16/6**
Q-BC 50/3H	Conical flask, 50 ml, 24/29 joint with hooks	**62/–**	**11/6**
JR-140	2 × Stainless steel springs, MF 40A	For price see entry in List No. sequence.	

SCHÖNIGER STOPPER

A 24/29 stopper designed for use in the micro elemental analysis of organic compounds by the oxygen flask method. The construction allows different types of sample-carrier to be attached without sealing, either by using the stem of the stopper as a hook or by inserting a wire through the capillary holder of the stopper. For use with 250 ml or 500 ml Erlenmeyer or iodine flasks.

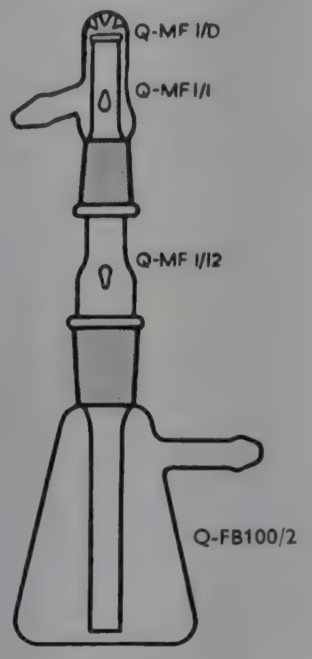
List No.	Cone	Dozen	Each
Quickfit			
Q-SB 24/S	24/29	**146/–**	**13/6**

DILATOMETER

For measuring the expansion of edible oils and fats over the temperature range during which melting takes place.

List No.	Description	Joint	Six	Each
Quickfit				
Q-WE 12/1	Dilatometer body	14/23	**337/6**	**62/6**
Q-SB 14DL	Stopper portion	14/23	**51/6**	**9/6**

All items on this page normally available from stock (code *m*).



Q-2 NRV

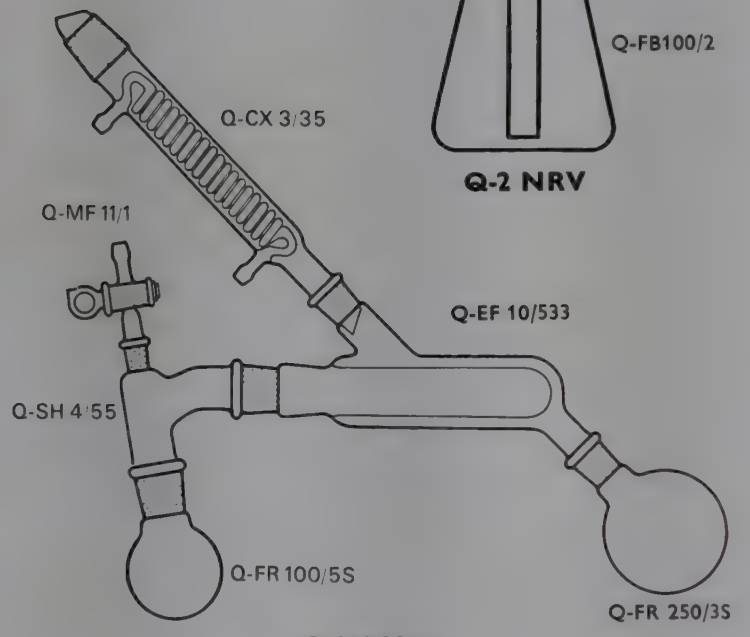
NON-RETURN VALVE

List No.	Description	Cone	Socket	Six	Each
Quickfit **Q-2NRV**	**Assembly**	—	—	**373/–**	**68/–**
	Components				
Q-MF 1/1	Cap	—	14/23	**97/–**	**18/–**
Q-MF 1/D	Ground disk ...	—	—	**23/–**	**5/2**
Q-MF 1/12	Valve body ...	14/23 and 19/16	—	**162/–**	**30/–**
JR-140	2 × Stainless steel springs MF 40A	—	—	For prices see entries on pages stated	Page 440
Q-FB 100/2	Buchner flask 100 ml	—	19/26		658

VACUUM DRYING PISTOL

A simple piece of apparatus which can function either as a vacuum drying pistol, a vapour bath, or a jacketed distillation flask.

List No.	Description	Socket	Cone	Six	Each
Quickfit **Q-100 VBP**	**Assembly** ...	—	—	**982/6**	**182/–**
	Components				
Q-EF 10/533	Jacketed tube ...	24/29 and 34/35	24/29	**335/–**	**62/–**
Q-FR 100/5S	Desiccant flask 100 ml	34/35	—	For prices see entries on pages stated	Page 652
Q-FR 250/3S	Boiling flask, 250 ml	24/29	—		652
Q-CX 3/35	Coil condenser ...	—	34/35 and 24/29		648
Q-SH 4/55	Stillhead	14/23	34/35		664
Q-MF 11/1	Stopcock adapter	—	14/23		646

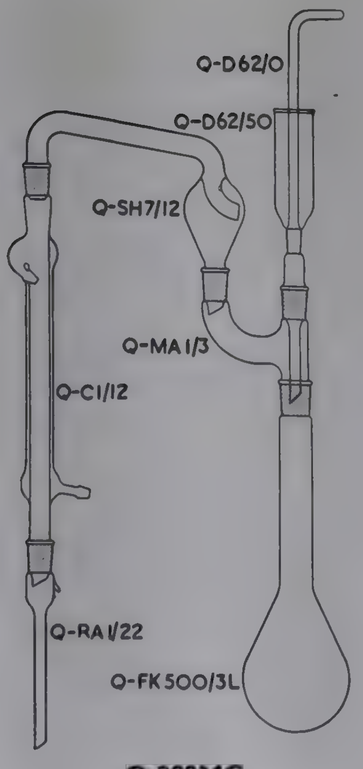


Q-100 VBP

NITROGEN DETERMINATION

MACRO KJELDAHL DISTILLATION UNIT

This assembly uses the same flask for distillation as for the digestion stage and conversion from one stage to the other can be done very quickly. All the distillation apparatus except for the flask is carried on one straight rod by means of special spring clips, and can easily be moved into position merely by adjusting one bosshead.



Q-280MC

List No.	Description	Socket	Cone	Six	Each
Quickfit **Q-280 MC**	**Assembly**	—	—	**739/6**	**137/–**
	Components				Page
Q-C 1/12	Condenser, 200 mm jacket length	19/26	19/26	For prices see entries on pages stated	647
Q-D 62/50	Plug dropping funnel 50 ml	10/19	19/26		662
Q-FK 500/3L	Kjeldahl flask, 500 ml	24/29	—		657
Q-MA 1/3	Multiple adapter	10/26	24/29		640
Q-MF 40/13/24	2 × Double spring clips	—	—		669
Q-D 62/0	Funnel plug	—	10/19		662
Q-RA 1/22	Delivery adapter	19/26	—		642
Q-SH 7/12	Splash head	19/26	19/26		665

All items on this page normally available from stock (code *m*).

NITROGEN DETERMINATION

SEMI-MICRO KJELDAHL APPARATUS

List No.	Description	Socket or cup	Cone or ball	Six	Each
Quickfit					
Q-21/50 MC	**Assembly 50 ml** ...	—	—	**675/-**	**125/-**
Q-21/100 MC	**Assembly 100 ml** ...	—	—	**684/-**	**126/9**
	Components				
Q-MC 1/F19	Liebig condenser, 280 mm effective length	S19	—	**154/-**	**28/6**
Q-MC 21	Distillation head ...	10/19	19/26 and S19	**359/-**	**66/6**
Q-MC 22/50	Kjeldahl flask, 50 ml	19/26	—	**63/6**	**11/9**
Q-MC 22/100	Kjeldahl flask, 100 ml	19/26	—	**73/-**	**13/6**
JR-010	Funnel plug (CNB10)	—	10/19	For prices see entries in List No. sequence.	
JR-140	Stainless steel spring MF40A	—	—		
JR-260	Clip JC19 for spherical joint	—	—		

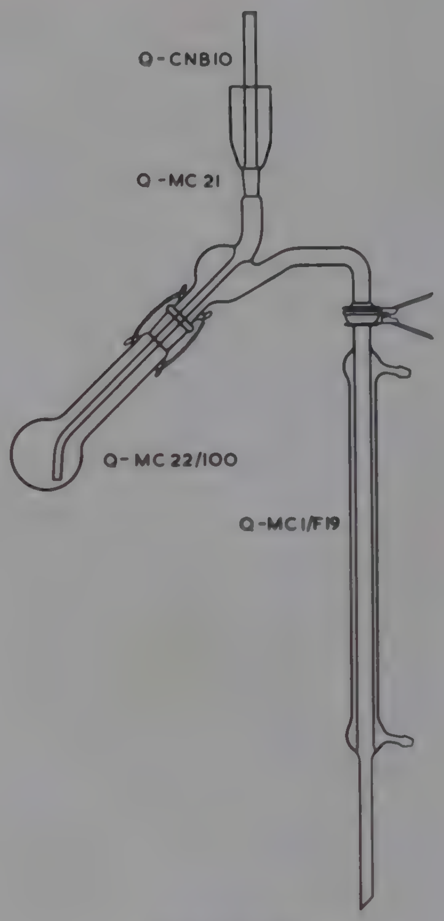
ABSORPTION TRAPS
Suitable for absorbing sulphur dioxide in Kjeldahl determinations or hydrogen chloride in Friedel-Kraft reactions without use of fume cupboard.

List No.	Description	Socket	Cone	Six	Each
Quickfit					
Q-MC 12/33	Lower chamber, 250 ml ...	24/29	24/29	**208/-**	**38/6**
Q-MC 12/33/500	Lower chamber, 500 ml ...	24/29	24/29	**224/-**	**41/6**
Q-MC 13/33	Upper chamber	24/29	24/29	**243/-**	**45/-**

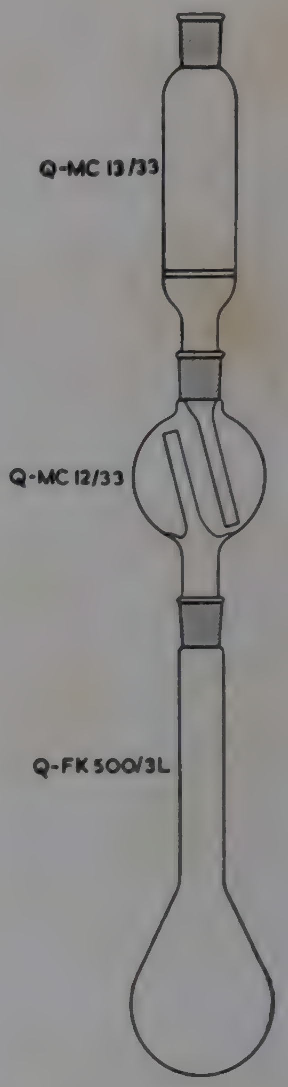
MARKHAM STILL, for micro-Kjeldahl determination. To BS 1428 Part B2.

List No.	Description	Socket or cup	Cone or ball	Six	Each
Quickfit					
Q-46 MC	**Assembly**	—	—	**972/-**	**180/-**
	Components				
Q-FC 16B	Funnel plug	—	10/19	For price see entry on page 668.	
Q-MC 46	Markham still body with steam trap jacket 25 ml	10/19	S19	**756/-**	**140/-**
Q-MC 1/F19	Liebig condenser ...	S19	—	For price see entry above.	
JR-260	Clip JC19, for spherical joint	—	—	For price see entry in List No. sequence.	

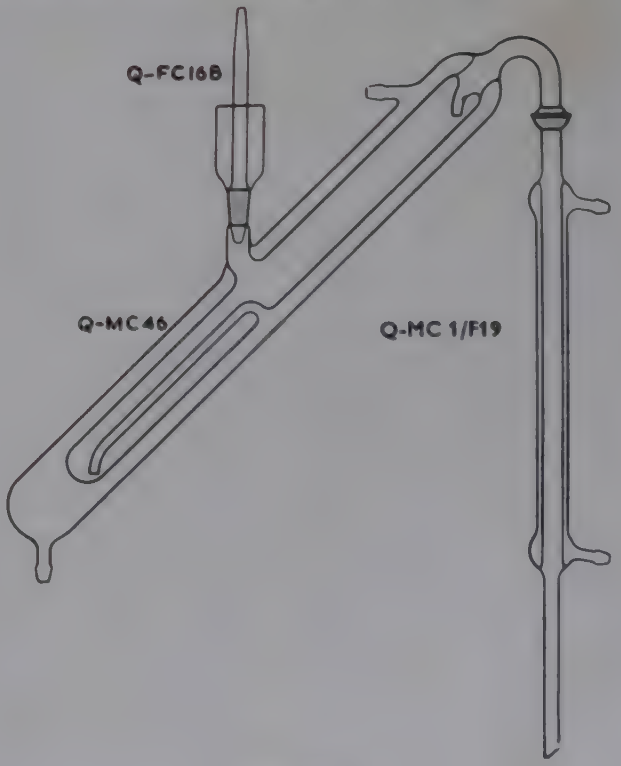
Kjeldahl apparatus for macro and micro determination of nitrogen see NITROGEN DETERMINATION.



Q-21/100 MC



KJELDAHL FLASKS see page 286
MULTIPLE EXHAUST MANIFOLD see pages 544 and 546.



Q-46 MC

All items on this page normally available from stock (code *m*).

QUICKFIT LIST No. INDEX

List No. Page
Q-BC 3CH 673
Q-BC 11 673
Q-BC 15P 673
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Q-KFR 50/2S	653
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Q-KFR 50/4S	653
Q-KFR 100/1S	653
Q-KFR 100/2S	653
Q-KFR 100/3S	653
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Q-KXA 42	640
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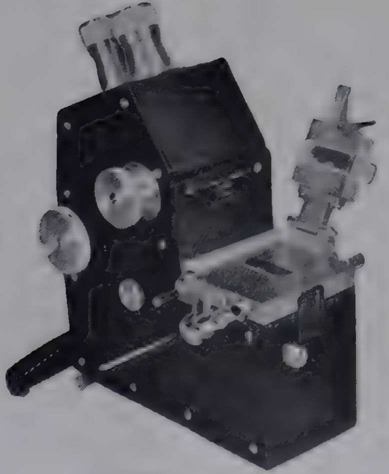
RB-820

RB-830



RF-020 RF-021
RF-025 RF-026

RAIN GAUGES

RB-820

RAIN GAUGE, Symon, British Association pattern, 5 in diameter. Comprises copper funnel with brass rim and stem, copper container and inner collecting can with lip. All exposed surfaces are bronze enamel finished. Includes 0·5 inch rainfall glass measure subdivided 0·01 in.
Each **£5.18. 0.** *c*

RB-830

RAIN GAUGE, Snowden, 5 in diameter, constructed of copper with heavy brass rim and stem. The outer container is fitted with sockets for holding the gauge in the ground by wooden stakes. With inner collecting can, graduated glass bottle and measure.
Each **£15. 3. 0.** *mN*

RB-840

RAIN GAUGE MEASURE, glass, for use with 5 in funnels. Capacity 0·5 in subdivided 0·01 in.
Each **£0. 7. 0.** *c*

REACTION VESSELS	see	QUICKFIT APPARATUS
REAGENT BOTTLES	see	BOTTLES
RECORDERS, strip chart	see	ELECTRICAL INSTRUMENTS

REFRACTOMETERS

RF-020

REFRACTOMETER, Abbe, *B & S,* for the examination of oils, fats, optical glass, sugar solutions, etc. The refractive index of substances between 1·300 and 1·700 is read directly to the third decimal place from the totally enclosed glass scale. Partial dispersion is obtained by calculation using the dispersion circle reading and the tables provided. With protected thermometer, horizontal measuring prism surface, for illumination by transmitted or reflected artificial light. With 4V 0·3A M.E.S. bulb and built-in transformer ... ... Each **£145. 0. 0.** *f*

RF-021

REFRACTOMETER, Abbe, *B & S,* as RF-020 but with prism system for refractive indices up to 1·740.
Each **£155. 0. 0.** *fN*

RF-025

REFRACTOMETER, Abbe, *B & S,* as RF-020 but with additional engraved glass scale for reading directly the % of soluble solids in sugar solutions and fruit pulp, etc.
Each **£150.15. 0.** *f*

RF-026

REFRACTOMETER, Abbe, *B & S,* as RF-025 but with prism system for refractive indices up to 1·740.
Each **£160.15. 0.** *fN*

REPLACEMENT PART

RF-030 **Thermometer,** scale span 0–75°C. Each **£1. 5. 0.** *f*

Items on this page normally available from stock except those coded *N*.

RF-060

REFRACTOMETER, Abbe, *B & S,* **high accuracy,** as RF-020 but with linear scale and micrometer screw enabling refractive indices to be found with an accuracy of 0·00004 using the tables provided. For use with sodium light which eliminates border line colour. With protected thermometer and horizontal prism surface.
Each **£175. 0. 0.** *f*

REPLACEMENT PARTS

RF-030 **Thermometer.** For price see entry in List No. sequence.

RF-080

RF-080

REFRACTOMETER, Abbe, *Hilger,* for rapid, routine measurement of the refractive index of very small quantities of liquids enclosed as a film between two water jacketed prisms of dense flint glass. Refractive index range 1·3 to 1·7 with readings accurate to 0·0002. The compensator is provided with a scale from which dispersion may be calculated with the conversion tables provided. For use with transmitted or reflected artificial or natural light. In case ... ... Each **£146. 0. 0.** *fN*

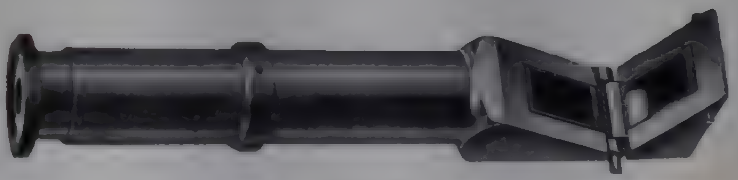
ACCESSORY FOR ABBE REFRACTOMETERS

LH-400 **Sodium lamp,** *Gallenkamp.* For details and price see entry in List No. sequence.

RF-140

REFRACTOMETERS, pocket type, for soluble solids in sugar solutions. In leather case.

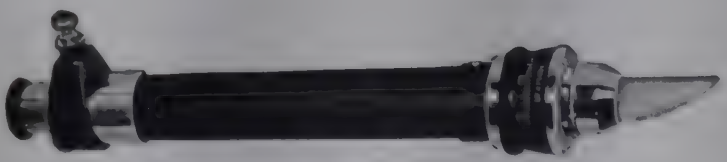
% range	0–50	15–55	40–85	
Refractive index range	1·3330 1·4200	1·3357 1·4307	1·3997 1·5003	
Each	**£18. 5. 0.**	**£18. 5. 0.**	**£22. 10. 0.**	*f*



RF-140

RF-210

REFRACTOMETER, immersion, for the examination of alcoholic liquids, with prism having a range from 1·325 to 1·367, an ocular scale and a micrometer screw with drum reading to 0·1 equivalent to 0·00004 refractive index. With metal beaker having a glass window.
Each **£66. 10. 0.** *fN*



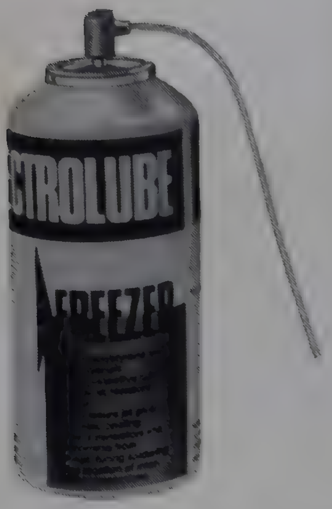
RF-210

THERMOSTATIC WATER CIRCULATOR FOR REFRACTOMETERS

A suitable assembly can be made from the following items:

WF-360 **Thermostatic water bath** ... fitted with
WF-376 **Circulating pump** ... ...
} For prices and details see entries in List No. sequence.

Items on this page normally available from stock except those coded *N.*



RJ-550

RJ-610

RJ-620

RJ-650

FREEZER

RJ-550
FREEZER AEROSOL, *Electrolube*, for rapidly cooling small objects and specimens down to −50°C. The spray material is non-toxic and non-inflammable and contains water repellent lubricant which first applies a thin protective film. Numerous laboratory applications include the cooling of melting point blocks and calorimeter bombs, rejoining mercury threads in thermometers, freezing of microtome knives and specimens, chilling of metallurgical samples, freezing of biological specimens for dissection, shrinking piece parts and cooling during and after soldering. In can containing 6 oz (170 g).
Carton of 12 **£8. 5. 0.** Each **£0.15. 0.** *mS*

CONSERVATORS

For storage of frozen materials at temperatures in the region of −20°C in ambient temperatures up to 30°C.

RJ-610
REFRIGERATOR, Conservator, *Lec,* **120 litres (4·2 ft³) capacity,** with aluminium storage compartment and ¼ hp motor. The thermostat is adjustable over the range −23°C to −12°C.
Overall dimensions 97 × 54 × 54 cm.
Internal dimensions 64 × 43 × 43 cm.
For 200/240V 50 Hz supplies ... Each **£52.10. 0.** *f*

RJ-620
REFRIGERATOR, Conservator, *Frigidaire,* **200 litres (7·2 ft³) capacity,** with galvanised sheet steel storage compartment and ⅓ hp motor. The thermostat controls the storate temperature between −18°C and −20°C.
Overall dimensions 99 × 76 × 60 cm.
Internal dimensions 66 × 64 × 48 cm.
For 200/250V 50 Hz supplies ... Each **£101. 0. 0.** *f*

When ordering please state voltage and nature of supply.

Cabinets for use in ambients 30° to 45°C and for 100/120V 60 Hz supplies are available to special order.

LOW TEMPERATURE CABINET

A small capacity refrigerator for operation at temperatures down to −40°C (−40°F) in ambient temperatures up to 27°C (+80°F.)

CONSTRUCTION

The steel storage compartment of **70 litres (2·6 ft³) capacity,** which can be used as an air or liquid bath, is contained in a welded steel cabinet mounted on rubber tyred castors and fitted with two polystyrene covers. Two capped tubulures are provided for insertion of electric cables, air lines or drive systems.

REFRIGERATION

The condensing unit is air cooled and comprises a twin cylinder reciprocating compressor driven by a ¼ hp motor operating with monochlorodifluoromethane (Freon 12) as a refrigerant. An adjustable indicating thermostat is mounted on the cabinet front.

DIMENSIONS

Overall	110 × 68 × 57 cm.
Internal	33 × 52 × 33 cm.

RJ-650
REFRIGERATOR, low temperature cabinet, *Frigidaire*, LTU26, as specification ... Each **£151.10. 0.** *f*

When ordering please state voltage and nature of supply.

Items on this page coded S normally available from stock.

GENERAL PURPOSE REFRIGERATORS

A range of front loading cabinets with magnetic door catches and hermetically sealed compressors. Suitable for use in ambient temperatures up to 43°C.

RJ-810

REFRIGERATOR, *Lec,* **capacity 94 litres (3·5 ft^3),** shelf area 0·6 m^2 (6·3 ft^2). With adjustable thermostat, 2 shelves and door racks. Overall dimensions 90 × 53 × 49 cm.

For 215/240V 50 Hz supplies ... Each **£38. 7. 0.** *m*
For 110/120V 60 Hz supplies ... Each **£38. 7. 0.** *m*

RJ-815

REFRIGERATOR, *Lec,* **capacity 140 litres (5·2 ft^3),** shelf area 0·8 m^2 (8·8 ft^2). With adjustable thermostat, semi-automatic defrost control, automatic interior lighting, 2 shelves and door racks. Overall dimensions 99 × 59 × 55 cm.

For 215/240V 50 Hz supplies ... Each **£49. 0. 2.** *m*
For 110/120V 60 Hz supplies ... Each **£49. 0. 2.** *m*

RJ-820

REFRIGERATOR, *Lec,* **capacity 190 litres (7 ft^3),** shelf area 1·1 m^2 (12 ft^2). With adjustable thermostat, push button defrost, automatic interior lighting, 3 shelves and door racks. Overall dimensions 120 × 57 × 65 cm.

For 215/240V 50 Hz supplies ... Each **£62.17. 4.** *m*
For 110/120V 60 Hz supplies ... Each **£62.17. 4.** *m*

RJ-825

REFRIGERATOR, *Lec,* **capacity 350 litres (13 ft^3),** shelf area 1·6 m^2 (17 ft^2). With adjustable thermostat, push button defrost, automatic interior lighting, 6 shelves and door racks. Overall dimensions 169 × 77 × 65 cm.

For 215/240V 50 Hz supplies ... Each **£114.10. 0.** *m*
For 110/120V 60 Hz supplies ... Each **£114.10. 0.** *m*

When ordering refrigerators please state voltage and nature of supply.

The price includes installation costs in Great Britain and Northern Ireland but in all other countries there is an extra charge payable to manufacturer's local agent.

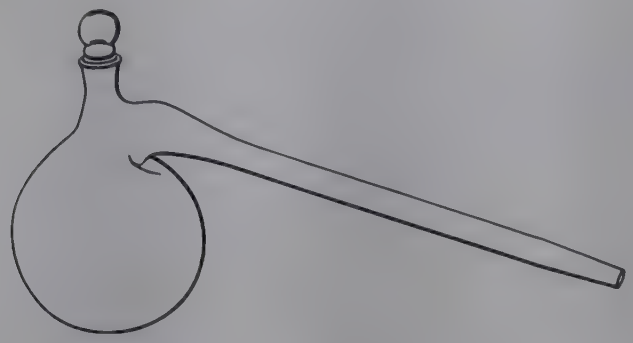
Refrigerators for under bench and wall fixing see FU-996 to FU-999 in List No. sequence.

ICE MAKING MACHINES see IH-255 to IH-282 in List No. sequence.

RJ-810
RJ-815

RJ-820

RJ-825



RP-020

RETORTS

RP-020

RETORTS, *Pyrex brand* glass, handmade, **with stopper.**

Nominal capacity	100	250	500 ml	
Std. pack. qty.	4	12	4	
Std. pack	**63/–**	**224/–**	**86/–**	*d*
Each	**17/8**	**20/9**	**23/10**	

ROD

For a summary of the properties of soda-lime and borosilicate glasses see TUBING, glass on page 778.

RT-020

ROD, soda-lime glass, best quality free from lead. In standard lengths of 150 cm approx. The figures in pack qty. column indicate the average number of 150 cm lengths in a pack of approx. 5 kg.

Diameter						
Nominal mm	Tolerance ±mm	Pack qty. approx.	Per pack	Per 12 lengths	Per length	
3·5	0·5	120	**36/–**	**5/–**	**2/6**	c
4·5	0·5	87	**29/–**	**5/4**	**2/6**	c
5·5	0·5	53	**29/–**	**7/6**	**2/6**	c
6·5	0·5	40	**29/–**	**9/3**	**2/6**	c
7·5	0·5	29	**29/–**	**12/6**	**2/8**	c
9	1	19	**29/–**	**18/6**	**3/2**	c
11	1	14	**29/–**	—	**3/8**	c

See **NOTE** opposite.

RELAYS **RESISTANCES**	} see ELECTRICAL CONTROLS
RESISTANCE BOXES	see ELECTRICAL INSTRUMENTS
RESPIRATORS	see CLOTHING, protective
RETORT STANDS	see STANDS & CLAMPS

RT-030

ROD, *Pyrex brand* **borosilicate glass,** in standard lengths of 150 cm approx. The figures in std. pack qty. column indicate the number of 5 ft lengths in a standard pack.

For satisfactory working this glass requires a flame enriched with oxygen to give a sufficiently high temperature. Blowpipes BR-155 and BR-195 are particularly recommended—see details in List No. sequence.

Diameter						
Nominal mm	Tolerance ±mm	Std. pack qty.	Std. pack	Per 12 lengths	Per length	
3·5	0·5	245	**202/–**	**11/3**	**2/7**	*d*
4·5	0·5	145	**185/–**	**17/–**	**3/–**	*d*
5·5	0·5	155	**290/–**	**25/6**	**3/8**	*d*
7	1	95	**249/–**	**33/–**	**4/3**	*d*
9	1	55	**177/–**	**41/–**	**4/10**	*d*
11	1	35	**168/–**	—	**6/2**	*d*
13	1	25	**169/–**	—	**8/3**	*d*
15	1	20	**178/–**	—	**10/–**	*d*
17	1	15	**173/–**	—	**12/10**	*d*
19	1	10	**144/–**	—	**16/–**	*d*

NOTE: All glass rod prices apply to rod in standard lengths. Rod may be cut to shorter lengths at extra cost depending on size, finish required, wastage and length tolerance. Quotations on receipt of details.

RT-060

ROD, Perspex, colourless transparent, in lengths up to 6 ft (180 cm).

Diameter					
actual	¼	½	¾	1 in	
approx.	6	12	19	25 mm	
Six feet	**13/–**	**23/–**	**41/–**	**72/–**	c
Foot	**3/8**	**5/2**	**7/10**	**13/–**	

RT-080

ROD, PTFE, natural colour, in lengths up to 6 ft (180 cm).

Diameter					
actual	¼	½	¾	1 in	
approx.	6	12	19	25 mm	
Foot	**6/–**	**20/6**	**33/6**	**58/–**	c

PP-792	**Rod, polythene** ...	} For details and prices see entries in List No. sequence.
PP-793	**Rod, PVC**	

STIRRING RODS

RT-200

RODS, STIRRING, soda glass, 20 cm long, 6–7 mm dia. with fused ends.

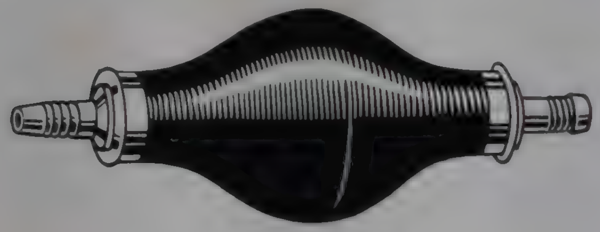
Gross **£2. 8. 0.** Dozen **£0. 5. 4.** *a*

All items on this page normally available from stock.

RV-010

RUBBER BANDS, natural rubber, width 6 mm, in boxes of one gross.

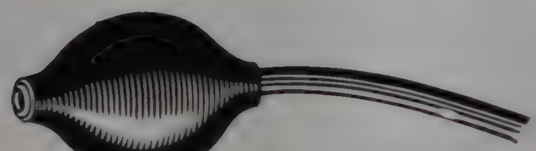
Length	50	75 mm	
Dozen boxes	74/–	106/–	c
Box	7/4	9/9	



RV-030

RV-030

BELLOWS, PVC, with screwed inlet and outlet valves and nozzles for rubber tubing connection. Bulb diameter 55 mm ... Dozen £4. 12. 0. Each £0. 8. 9. c

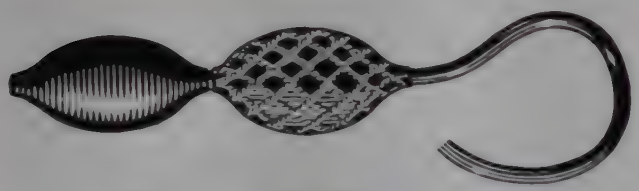


RV-045

RV-045

BLOWBALL, PVC, with inlet and outlet valves and short length of 5 mm internal diameter rubber tubing connected to outlet. Bulb diameter 45 mm.

Dozen £2. 13. 0. Each £0. 5. 8. c

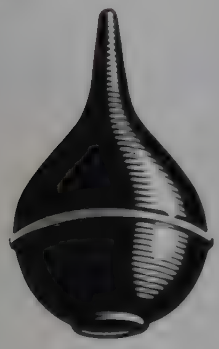


RV-050

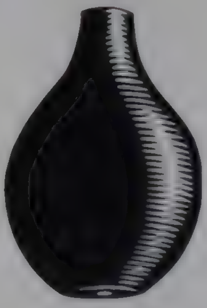
RV-050

RUBBER BLOWBALLS, with inlet and outlet valves, air reservoir protected by a net, and a short length of rubber tubing connected to outlet.

Size No.	2	4	6	
Bulb diameter	40	50	60 mm	
Reservoir diameter (inflated)	65	75	100 mm	
Dozen	140/–	150/–	190/–	c
Each	12/9	13/6	17/6	



RV-060



RV-080

RV-060

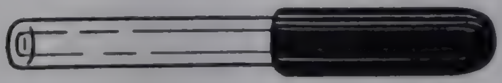
BLOWBALLS, pear shape, plasticised PVC, suitable for removing dust from balance mechanisms and from lenses of optical instruments, etc. Bulb diam. 70 mm approx.

Dozen £2. 1. 0. Each £0. 4. 10. c

RV-080

RUBBER BULBS, pear shape, moulded rubber, for use with pipettes, etc.

Capacity approx.	7·5	15	25	40 ml	
Dozen	42/–	44/–	47/–	49/–	c
Each	4/11	5/–	5/4	5/6	



RV-180

RV-180

RUBBER POLICEMAN, a rubber tube, approx. 40 mm long, closed at one end for stirring rods, etc., and for temporary closures when glass blowing.

Internal diameter	3	4·5	6	8	10 mm	
Carton quantity	72	72	72	72	72	
Dozen cartons	145/–	180/–	210/–	240/–	265/–	c
Carton	13/3	16/6	19/–	22/–	24/–	

RV-181

RUBBER POLICEMAN, carton of 9 dozen **assorted** sizes of RV-180 as follows; 1 doz. each 3 mm and 10 mm, 2 doz. each 4·5 mm and 8 mm, 3 doz. 6 mm.

Dozen cartons £16. 0. 0. Carton £1. 9. 0. c

RV-220

RV-220

RUBBER TEATS, latex rubber, for dropping pipettes. The 0·8 ml capacity is suitable for use with Dreyer pipette ME-380.

Capacity approx.	0·8	1·5	2·0	2·5	4·5 ml	
Carton quantity	72	72	72	72	72	
Dozen cartons	116/–	130/–	145/–	160/–	240/–	c
Carton	10/6	11/9	13/3	14/6	22/–	

RV-221

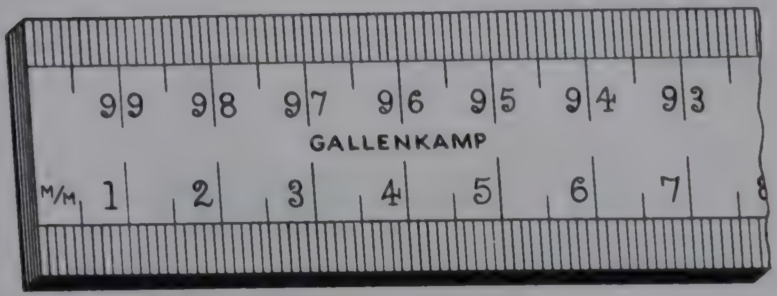
RUBBER TEATS, carton of 9 dozen **assorted** sizes of RV-220 as follows; 1 doz. each 0·8 and 4·5, 2 doz. each 1·5 and 2·5, 3 doz. 2·0 ml capacity.

Dozen cartons £10. 5. 0. Carton £0. 18. 6. c

RUBBER, adapters for Gooch crucibles see CRUCIBLE ACCESSORIES
  , **bungs** see STOPPERS, rubber
  , **gloves** see CLOTHING, protective
  , **tubing** see TUBING

All items on this page normally available from stock.

RULES


99
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GALLENKAMP
M/M
1
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3
4
5
6
7

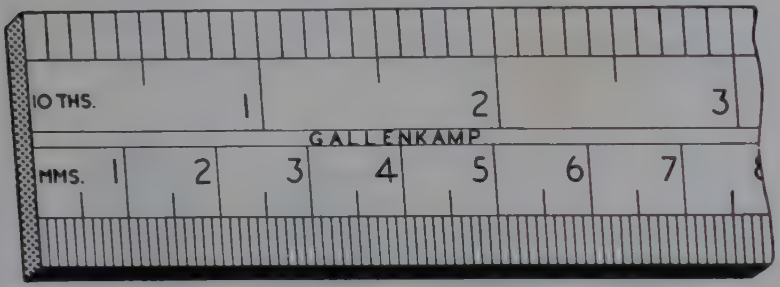
RX-021 and RX-022

RX-021

RULE, maple, horizontal reading, length 1 metre, width 25 mm, thickness 5 mm. Subdivided cm and mm on both edges.
Dozen **£4.10. 0.** Each **£0. 8. 6.** *c*

RX-022

RULE, as RX-021 but **boxwood** ... Each **£0.12. 6.** *m*


10 THS.
1
2
3
GALLENKAMP
MMS.
1
2
3
4
5
6
7

RX-023, RX-024 and RX-026

RX-023

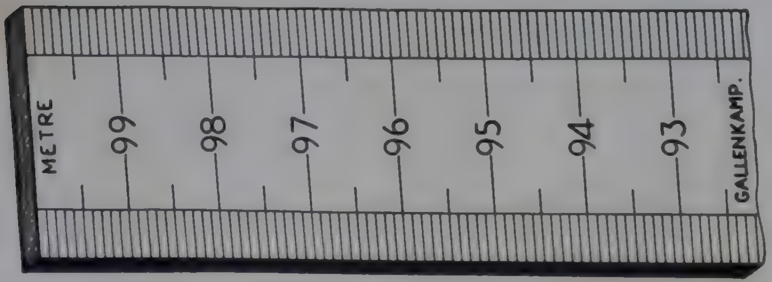
RULE, maple, horizontal reading, length 1 metre, width 25 mm, thickness 5 mm. Subdivided cm and mm one edge; inch and $\frac{1}{10}$ on other edge.
Dozen **£3.18. 0.** Each **£0. 7. 8.** *c*

RX-024

RULE, as RX-023, but **boxwood.** ... Each **£0.12. 6.** *m*

RX-026

RULE, maple, horizontal reading as RX-023 but length 0·5 metre ... Dozen **£2. 3. 0.** Each **£0. 5. 0.** *c*


METRE
99
98
97
96
95
94
93
GALLENKAMP.

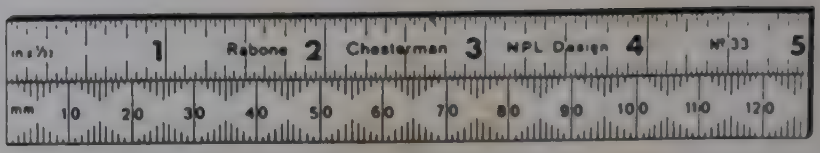
RX-028 and RX-029

RX-028

RULE, maple, vertical reading, length 1 metre, width 25 mm, thickness 5 mm. Subdivided mm and cm on both edges. ... ... Dozen **£4.10. 0.** Each **£0. 8. 6.** *c*

RX-029

RULE, vertical reading as RX-028 but **boxwood.**
Each **£0.12. 6.** *m*


ins ¹⁄₃₂
1
Rabone 2
Chesterman 3
NPL Design 4
No 33
5
mm
10
20
30
40
50
60
70
80
90
100
110
120

RX-055

RX-055

RULE, steel, NPL design, subdivided $\frac{1}{20}$ in/mm and $\frac{1}{32}$ in/mm for measurement and conversion.

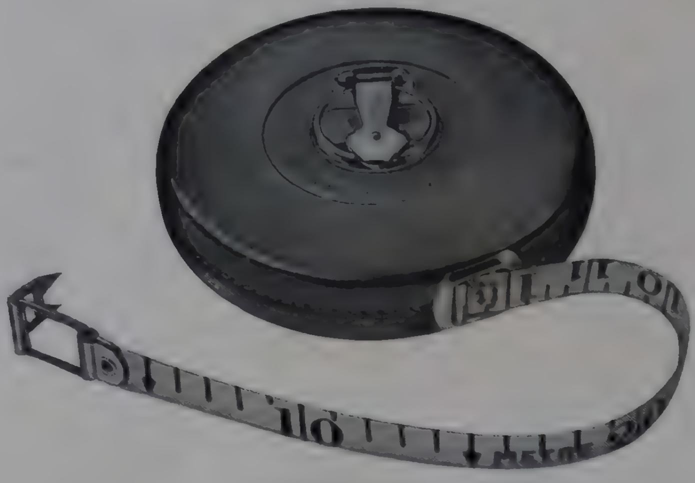
Length	5	10 in	
Each	**6/6**	**10/3**	*m*

RABONE CHESTERMAN
INTER FLEX RULE
315
2m.
MADE IN ENGLAND
INTERFLEX RULE
FOR INSIDE MEASUREMENT

RX-060

RX-060

RULE, spring flex, concavo-convex, length 2 metres, width 12 mm, in steel case with sliding stop; for inside, 'end-on' and 'hook-over' measurements. Subdivided m, cm and mm; inch, $\frac{1}{16}$ in and $\frac{1}{32}$ in for first two inches.
Each **£0. 9. 0.** *m*



RX-105

RX-105

TAPES, measuring, plastics finished linen stabilised by interwoven metallic threads. Tape width 17 mm. Subdivided one side m, dm and cm; other side ft, in and $\frac{1}{4}$ in. In leather case with folding handle for reeling in.

Length	10 33	20 66	30 m 100 ft	
Each	**33/9**	**48/3**	**64/9**	*m*

SLIDE RULES see CALCULATORS.

All items on this page normally available from stock.

SAMPLE DIVIDERS

For dividing powdered or granular materials into two or more portions of similar particle size distribution to that of the bulk sample.

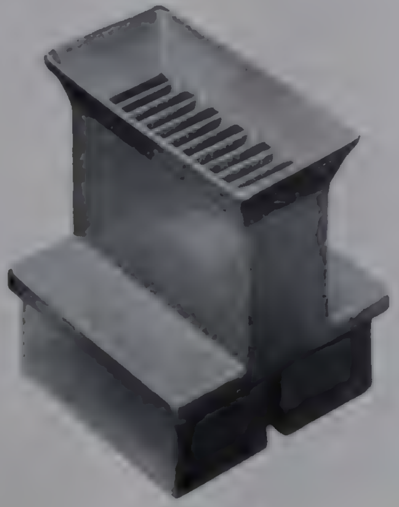
GRAVITY OPERATED

SA-590

SAMPLE DIVIDER, riffle pattern, stainless steel, based on the design recommendations of **BS 812 'Methods for sampling and testing of mineral aggregates sands and fillers', BS 1377 'Methods of testing soils for civil engineering purposes' and BS 1796 'Methods for the use of BS fine mesh test sieves'.** With twelve ¼ in apertures and three sample collecting containers, each container having a capacity of approximately 300 ml ... ... Each **£22. 10. 0.** *m*

SA-592

SAMPLE DIVIDER, as SA-590 but with twelve ½ in apertures and three sample collecting containers, each container having a capacity of approximately 1500 ml. Each **£24. 10. 0.** *m*



SA-590

SA-600

SAMPLE DIVIDER, riffle pattern, tinned steel, to **BS 1017 Part I 'The sampling of coal' Fig. 13.** With twelve 1 in apertures and three sample collecting containers, each container having a capacity of approximately 10 litres ... ... Each **£43. 0. 0.** *m*

SA-600

MECHANICALLY OPERATED

SA-620

SAMPLE DIVIDER, cascade, with 2·5 litre capacity hopper mounted over a conical distributor which together with six receiving bins is fitted to a turntable. The turntable assembly rotates at 52 rev/min and the bulk powder which falls from the hopper is divided uniformly into six portions. Hopper, distributor, turntable and cover are of aluminium alloy and the bins are of stainless steel. Weight 19 kg. Dimensions 34 cm dia., 50 cm high. For 220/240V 50 Hz single phase supplies. Each **£105. 0. 0.** *fN*

SA-630

SAMPLE DIVIDER, centrifugal, with 5 litre stainless steel hopper from which powdered or granular sample material falls into a dished spinner. The spinner rotates at 450 rev/min on an extended shaft which is fitted with a hard rubber impeller to prevent blocking of the hopper throat. Centrifugally distributed sample particles pass over a cast bronze dividing head and are discharged through two spouts fitted to the outer cover. Quickly dismantled for cleaning. Weight 25·5 kg. Dimensions 36 cm dia., 56 cm high. For 220/240V 50 Hz single phase supplies. Each **£135. 0. 0.** *fN*

SAMPLE CRUSHERS AND GRINDERS

Full details of these will be found listed under the heading MILLS.

SIEVES AND SHAKING MACHINES

Full details of these will be found in alphabetical listing in this catalogue.

SA-620

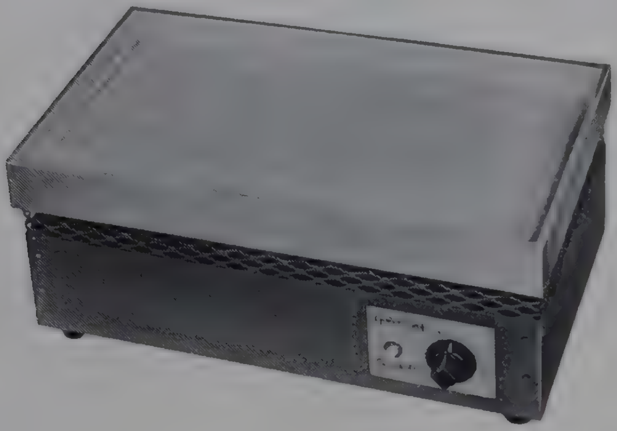
SA-630

Items on this page normally available from stock except those coded *N.*

Gallenkamp ELECTRICALLY HEATED SAND BATH, 325°C

- **Working area 47×27 cm**
- **Temperature controlled by energy regulator**
- **Efficient insulation to protect bench top**
- **Even heating without the presence of fluids**

An electrically heated sand bath for heating glassware containers and small objects where even heat is required but the use of a fluid bath containing water or oil is undesirable. The bath is of cast iron, hot process aluminium sprayed to resist corrosion. It is mounted on a robust steel base which is efficiently insulated to prevent overheating the bench top. Heating is by a sheathed 2 kW element controlled by an energy regulator with an arbitrary scale of 100 divisions. Maximum effective sand temperature is about 325°C. Bath dimensions 47×27×2·5 cm deep.



SA-855

SA-855

SAND BATH, *Gallenkamp*, electrically heated, as specification, with energy regulator and load indicator lamp. For 220/240V a.c. single phase supplies.
Each **£32.10. 0.** *b*

REPLACEMENT PART

HL-056 **Heating element.** For price see entry in List No. sequence.

Other voltages available to special order.

When ordering please state voltage and nature of supply

FLUIDISED SAND BATHS, 350°C

British Patent No. 732,101

Fluidised sand baths have the advantages of ease of access, rapid and uniform heat transfer, freedom from loss by evaporation and absence of fire risk.

They can be used for heating glass apparatus and for testing at elevated temperatures. Heating is uniform regardless of the shape of the vessel.

The baths have a porous plate in the base through which clean, oil free air is blown at low pressure. Such a bath of fluidised particles behaves as a bath filled with an insulating, non-volatile liquid. It is not however possible to obtain such a close temperature control as in a true liquid because the effective specific heat of the fluidised solid is much lower than that of a liquid. On the other hand this small thermal capacity gives a rapid heat up from ambient temperature.

SA-904

Both models listed below have the following features:—

- Insulated stainless steel inner vessel.
- Air flow adjustment valve.
- Safety device to switch off the heater in the event of an air supply failure.
- Maximum temperature approximately 350°C.

Both models require up to 85 l/min of air at 0·2 kg/cm^2 pressure.

SA-900

FLUIDISED SAND BATH, *Tecam*, **manual temperature control,** with inner vessel 17 cm diameter and 11·5 cm working depth, fitted with a 750W immersion heater. Heating time to 350°C approximately $1\frac{3}{4}$ hr. For 200/250V 50 Hz supplies. Complete with 4·5 kg charge of sand. ... ... Each **£55. 0. 0.** *f*

SA-904

FLUIDISED SAND BATH, *Tecam*, **thermostatically controlled,** with inner vessel 21 cm diameter and 14 cm working depth, fitted with two 1000W immersion heaters. Heating time to 350°C approximately 30 min. Temperature control is by means of a thermocouple situated just above the heaters and an external pyrometer controller, range 0–600°C. Accuracy of control is within 1% of the operating temperature. For 200/250V 50 Hz supplies. Complete with a 9 kg charge of sand. Each **£137. 0. 0.** *fN*

Models for operation on 100/120V a.c. supplies are available to special order.

When ordering please state voltage and nature of supply.

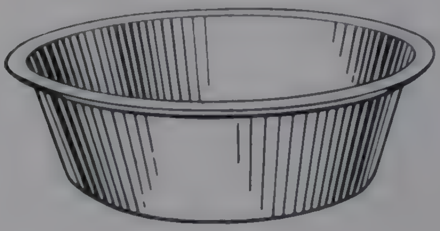
Items on this page normally available from stock except those coded *N*.

SAND BATHS

SA-920

SAND BATHS, tinned iron, with flat bottom and deep sloping sides. May also be used for oil baths.

Diameter	15	20	25 cm	
Depth	38	48	60 mm	
Dozen	**10/–**	**15/–**	**25/–**	c
Each	**2/6**	**2/11**	**3/8**	


SA-920

SCALES

SB-220

SCALES, MIRROR GLASS, vertical reading, with engraved figures and divisions. Width 30 mm.

Length	15	25	50	100 cm	
Subdivision	1	1	1	1 mm	
Dozen	**230/–**	**265/–**	**430/–**	**720/–**	c
Each	**21/–**	**24/–**	**39/–**	**66/–**	

SB-250

SCALES, PAPER, vertical reading, figured on edges. Overall width 56 mm, length 100 cm, subdivided in 1 mm.
Dozen **£1. 8. 6.** Each **£0. 3. 11.** c

SCISSORS

SB-620

SCISSORS, nickel plated steel.

Length	15 6	18 cm 7 in	
Dozen	**135/–**	**165/–**	c
Each	**12/3**	**15/–**	

SB-622

SCISSORS, stainless steel.

Length	15 6	18 cm 7 in	
Dozen	**225/–**	**280/–**	c
Each	**20/6**	**25/6**	

SB-220

SB-250

SCALPELS **SCISSORS, dissecting**		see DISSECTING INSTRUMENTS
SCOOPS		see SPATULAS
SCREWDRIVERS		see TOOLS
SECTION LIFTER		see DISSECTING INSTRUMENTS
SEDIMENTATION	**balance**	see PARTICLE SIZE
	tubes	see MEDICAL SCIENCES

SB-620
SB-622

All items on this page normally available from stock.

SEED TESTING

IMPROVED OTTAWA SEED BLOWER

Recommended by the Official Seed Testing Station, Cambridge. For the removal of testa, husks and other lightweight material from seeds and for the differentiation between light and heavy seeds.

The seed sample rests on a wire mesh tray and is agitated and elutriated in a glass tube by an air stream at controlled low pressure. Air pressure is measured on a micro-manometer reading to 0·1 mm. Lightweight material is carried over into a Perspex chamber, open to the atmosphere, and collected on a removable tray. Overall dimensions 87 × 26 × 38 cm.

SC-240

SEED BLOWER, improved Ottawa pattern, as specification, with glass tube and Perspex chamber. For a.c. single phase supplies only ... ... Each **£117. 12. 0.** *f*

When ordering please state voltage and nature of supply.

SC-350

SAMPLING STICK, brass, with three apertures for sampling grain in sacks at different depths.

Diameter	¾	1 in
Each	**£12. 5. 0.**	**£12. 15. 0.** *m*

SC-352

SAMPLING STICK, Belgian pattern, overall length 12 in ... ... Each **£3. 2. 0.** *m*

DR-022

SEED FORCEPS, stainless steel, with fine points, length 11·5 cm. For price see entry in List No. sequence.

SC-410

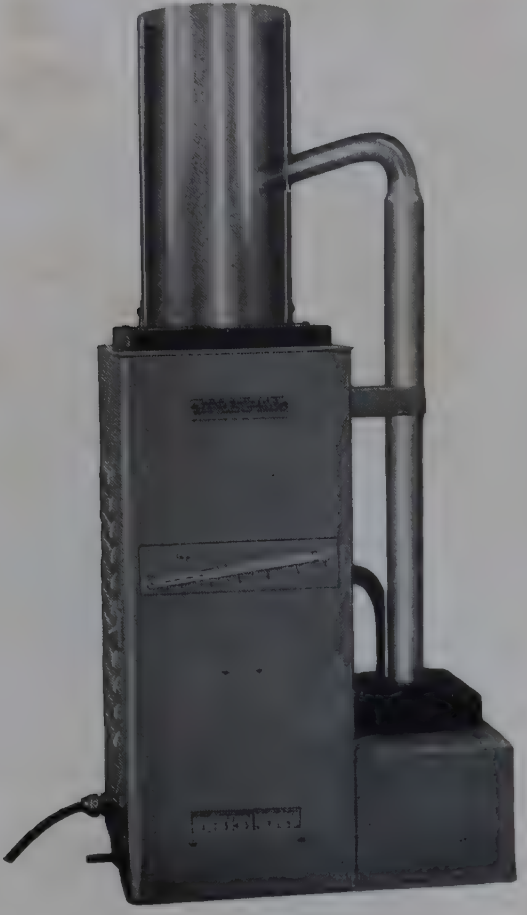
GERMINATION BATH, Copenhagen, comprising electrically heated tinned copper water bath, with drain cock and water level indicator, mounted on a metal stand and surmounted by a gabled observation cover. The hydraulic thermostat controls the water temperature to ±0·5°C at normal germination temperatures. Using 8 to 9 cm bell jars up to 30 tests can be accommodated on glass strips which rest on the inner ledges of the water tank. Overall dimensions excluding cover 61 × 51 × 25 cm, the cover being 20 cm high falling to 10 cm. Maximum loading 200W. For 110/120 or 200/250V a.c. supplies. **Without bell jars** ... ... Each **£62. 9. 6.** *f*

When ordering please state voltage and nature of supply

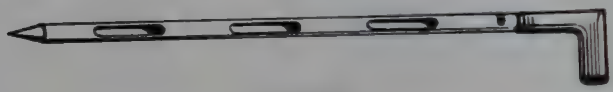
ACCESSORIES

SC-422 **Bell jar, plastics, Copenhagen pattern, 8 cm dia.**
Dozen **£1. 18. 0.** Each **£0. 4. 7.** *c*S

Pyrex brand **glass funnel** which may be used instead of above bell jars see FP-300 in List No. sequence.



SC-240



SC-350

SC-352

SC-422

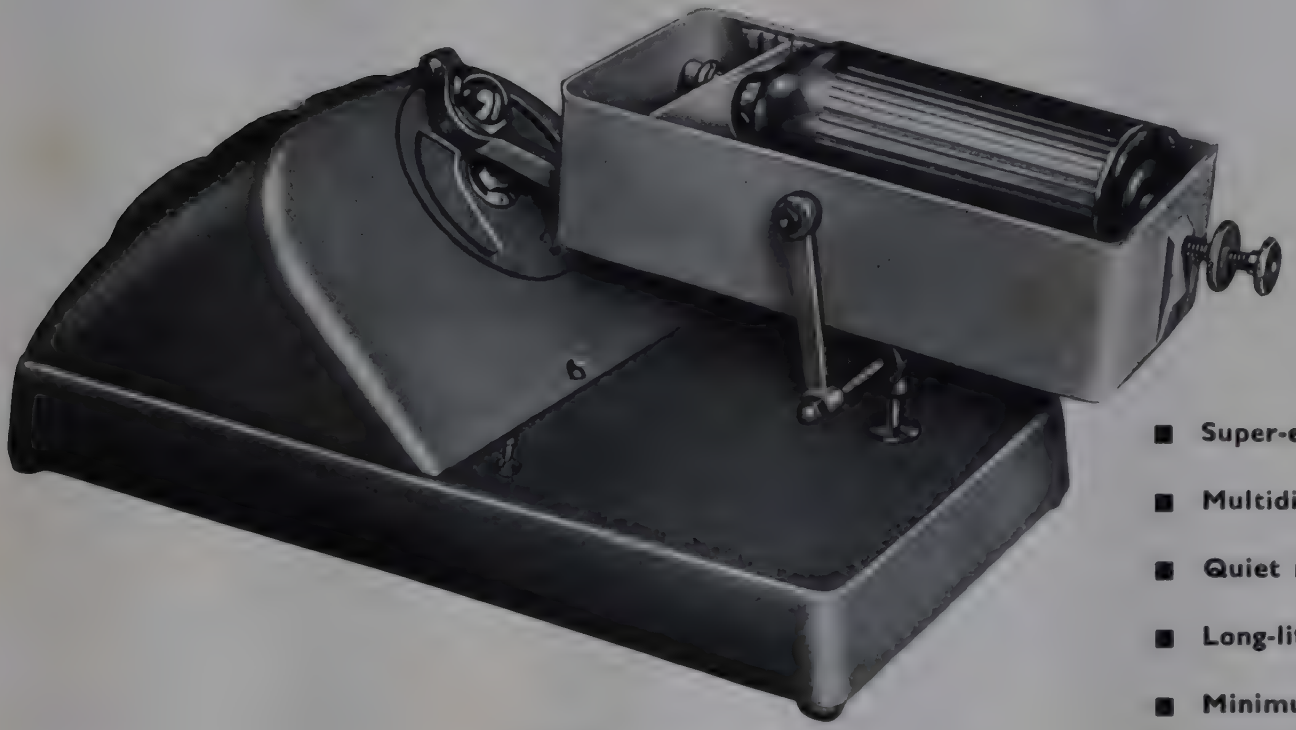
SC-410

OTHER APPARATUS REQUIRED IN SEED TESTING LABORATORIES

For incubation and germination		
Gallenkamp incubator	see	IH-100 et seq.
Whatman filter paper circles	see	FC-620
Ⓐ fritted filter plates	see	FD-530
Washbottles	see	WB-040 et seq.
For moisture testing		
Infrared balance	see	MV-660
For vernalization studies		
Refrigerator, low temperature	see	RJ-650

Items on this page coded S normally available from stock.

Gallenkamp SUPER SHAKER



SD-050

- Super-efficient shaking
- Multidirectional motion
- Quiet running
- Long-life bearings
- Minimum maintenance

The shaking action of this machine which is exceptionally vigorous and efficient is achieved by a combination of motions in three dimensions. In addition to the conventional longitudinal reciprocation, a rocking motion about a transverse horizontal axis and a rotational reciprocation about a vertical axis are applied. The machine is smooth and quiet in operation. The bottle carrier will accommodate single bottles from 125 ml to 2500 ml in the Winchester series.

CONSTRUCTION

The bottle carrier and base are constructed in an aluminium alloy. A positive, adjustable clamping device is used to hold the bottle.

SHAKING DRIVE

An arm, cast integral with the bottle carrier, is connected to an inclined crank wheel by a self aligning ball bearing. This crank wheel is driven through a vee-belt at 170 rev/min by a 1/20 hp induction motor. All bearings are grease packed ball races designed to run for long periods without attention.

DIMENSIONS

Overall	36 × 63 × 36 cm.
Carrier-internal	11·5 × 38 × 18 cm.
Weight	36 kg.

SD-050

SHAKER, SUPER, *Gallenkamp*, as specification.

For 220/240V 50 Hz single phase supplies.
Each **£118. 0. 0.** *b*

For 200/210V 50 Hz single phase supplies.
Each **£118. 0. 0.** *bN*

For 110/120V 60 Hz single phase supplies.
Each **£118. 0. 0.** *bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PART

SD-052 Driving belt ... ... Each £0. 15 6 b

SPECIAL PURPOSE SHAKING MACHINES

Shaking incubator	see	IH-350
Orbital incubator	see	IH-400
Shaking table for Conway units	see	MD-150
Shaker for haemacytometer pipettes, Kahn tubes, small bottles and vials	see	ME-530
Warburg shaker	see	ME-810
Sieve shaker	see	SD-160

Items on this page normally available from stock except those coded *N.*

FLASK SHAKER

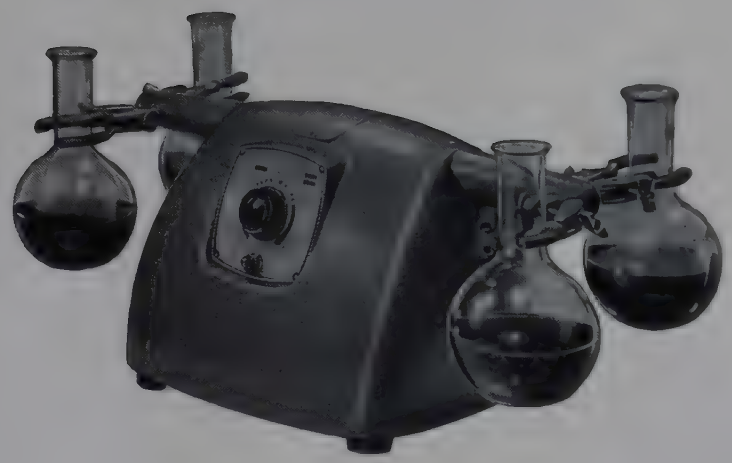
For efficiently shaking four or eight 500 ml flasks half full of liquid at speeds up to 500 oscillations per minute. The shaker is suitable for dissolving, dispersing, extracting, emulsifying and many other applications.

CONSTRUCTION

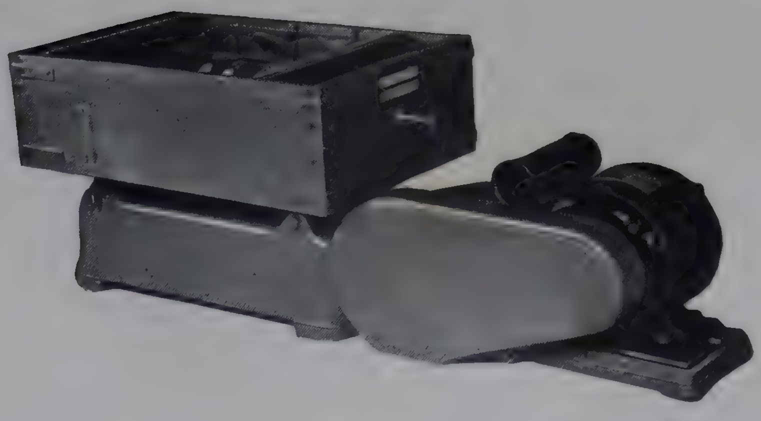
A heavy iron casting, mounted on vibration-absorbing rubber feet, contains a 1/30 hp fan cooled universal motor. The main support shaft, on which are mounted four or eight clamps which can be set at any desired angle, is linked to the motor in such a manner as to cause it to oscillate through a small amplitude. The motor speed is controlled by a toroidal potentiometer.

DIMENSIONS

Overall	24 × 25 × 47 or 73 cm.



SD-100



SD-130

SD-100

SHAKER, *Griffin*, for four flasks, as specification.

For 200/250V a.c./d.c. supplies ...	Each **£35. 0. 0.**	*f*
For 100/110V a.c./d.c. supplies ...	Each **£35. 0. 0.**	*fN*

SD-105

SHAKER, *Griffin*, for eight flasks, as specification.

For 200/250V a.c./d.c. supplies ...	Each **£38. 15. 0.**	*f*
For 100/110V a.c./d.c. supplies ...	Each **£38. 15. 0.**	*fN*

When ordering please state voltage and nature of supply.

HOMOGENISERS, for high speed dispersion and emulsification see MU-905 et seq. in List No. sequence.

SILENT SHAKER

For efficient two dimensional shaking of bottles, flasks, Kahn tubes etc., using a short throw at a high shaking speed of approximately 275-280 strokes/min. For two bottles up to 90 oz. Winchester series or several bottles of smaller capacity. The carrier accepts four racks each holding 30 Kahn tubes.

CONSTRUCTION

The carrier is a metal bound wooden box provided with two adjustable partitions one of which clamps the bottles in a vertical position. The carrier is suspended on a rigid casting to which the motor is clamped and which may be bolted on a firm support.

SHAKING DRIVE

The carrier is mounted on an underslung suspension whose bearings are sheathed with a tough resilient material giving total freedom from wear and noise. The cradle is driven from the $\frac{1}{4}$ hp tropicalised motor through a vee-belt, and can be made to travel 12·5, 25 or 37·5 mm at each throw.

DIMENSIONS

Overall	30 × 84 × 33 cm.
Carrier, internal	13 × 43 × 28 cm.

SD-130

SILENT SHAKER, *Griffin*, as specification.

For 220/240V a.c. supplies	Each **£72. 0. 0.**	*f*
For 100/110V a.c. supplies	Each **£72. 0. 0.**	*fN*

When ordering please state voltage and nature of supply.

ACCESSORY

SD-140	**Rack, Kahn,** with perforated rubber shelves to hold 30 tubes	Each **£9. 9. 0.**	*fN*

Items on this page normally available from stock except those coded *N*.

SIEVE SHAKING MACHINES

These machines impart a circular motion to the material being sieved so that it slowly travels round in a clockwise direction over the sieve gauze. Superimposed on this is a high speed vertical vibratory motion of very small amplitude which continually clears the sieve apertures. The combination of these two motions provides a very effective sieving action.

Overall dimensions 30×19×19 in (75×48×48 cm).

Supplied in returnable crates charged at **£1.10. 0.** which is refundable on return in good condition.

SD-160
SIEVE SHAKING MACHINE, to take 8 sieves of 8 in dia. or 13 sieves of 6 in or 4 in dia. For 230/250V a.c. single phase supplies. **Without sieves** Each **£64. 0. 0.** *mN*

SD-162
SIEVE SHAKING MACHINE, to take 6 sieves of 12 in, 8 in, 6 in or 4 in dia. For 230/250V a.c. single phase supplies. **Without sieves** ... Each **£72. 0. 0.** *mN*

When ordering please state voltage and nature of supply

ACCESSORY
TR-265 **Time switch,** for either of above machines, 60 min range. For price and details see entry in List No. sequence.

SIEVES

SE-022
SIEVES, brass wire gauze mounted in 6 in diameter, tinned metal frame.

Mesh	10	20	30	40	60	
Each	**15/–**	**15/–**	**15/–**	**15/–**	**15/–**	*m*
Mesh	80	90	100	120	200	
Each	**15/–**	**15/–**	**15/–**	**15/–**	**15/–**	*m*

SE-023
COVER AND RECEIVER, set, for sieves SE-022.
Set **£0. 8. 0.** *m*

SE-027
SIEVES, as SE-022 but mounted in 8 in diameter frame.

Mesh	10	20	30	40	60	
Each	**20/–**	**20/–**	**20/–**	**20/–**	**20/–**	*m*
Mesh	80	90	100	120	200	
Each	**20/–**	**20/–**	**20/–**	**20/–**	**20/–**	*m*

SE-028
COVER AND RECEIVER, set for sieves SE-027.
Set **£0.10. 0.** *m*

SE-045
SIEVES, standard test, fine mesh, to BS 410 Table 1, mounted in 8 in diameter polished brass frames.

Mesh	5	6	7	8	10	12	14	
Each	**38/–**	**38/–**	**38/–**	**38/–**	**38/–**	**38/–**	**38/–**	*m*

Mesh	16	18	22	25	30	36	
Each	**38/–**	**38/–**	**38/–**	**38/–**	**38/–**	**38/–**	*m*

Mesh	44	52	60	72	85	100	
Each	**38/–**	**38/–**	**38/–**	**38/–**	**38/–**	**38/–**	*m*

Mesh	120	150	170	200	240	300	350	
Each	**40/–**	**43/–**	**46/–**	**52/–**	**65/–**	**75/–**	**90/–**	*m*

SE-046
COVER AND RECEIVER, set, polished brass, for sieves SE-045 ... ... Set **£1. 5. 0.** *m*

SD-160

SE-022 with SE-023
SE-027 with SE-028

SE-100
SIEVING OUTFIT, 'Interchanger', a pocket investigating outfit comprising a polished brass body, cover and receiver with four rimmed sieving disks fitted with commercial quality woven wire gauzes of 30, 60, 90 and 120 mesh respectively. Complete in leather-cloth case with sieve brush. Dimensions, 4 in diameter, $1\frac{5}{8}$ in deep ... ... Set **£2.16. 0.** *m*

SIEVE ANALYSIS PAPER

SE-110
SIEVE ANALYSIS GRAPH PAPER, in pads of 25 sheets 30×24 cm. The upper half of the sheet is used for drawing a graph of the analysis, having a linear vertical scale from 0 to 100% by weight and a logarithmic horizontal scale from 30 to 6000 μ particle size (400 to $3\frac{1}{2}$ mesh scaled in BS and ASTM sizes). The lower half of the sheet is ruled for tabulation of results of up to 4 analyses.
Pad of 25 **£0. 5. 0.** *m*

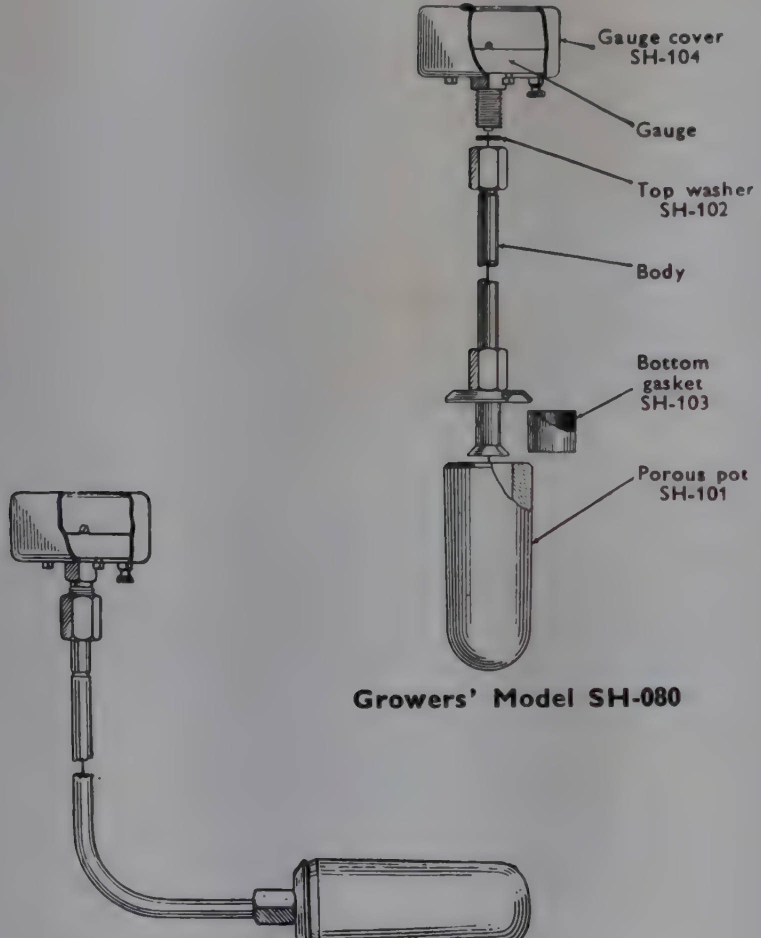
Items on this page normally available from stock except those coded *N.*

Gallenkamp SOIL MOISTURE TENSIOMETERS

For the determination of the force which a root must overcome in order to draw water from soil.

Widely used by commercial growers, horticultural and agricultural research stations.

- **Continuous reading of soil moisture tension**
- **Suitable for soil depths between 7·5 cm and 30 cm**



Growers' Model SH-080

Bench Model SH-085

PRINCIPLE

The reading on the gauge, calibrated in cm Hg, indicates the moisture tension of the soil. This reading is directly related to the effort plants must exert against surface force action to extract water from the soil. Tensions so measured are directly comparable and any particular tension indicates the same degree of water availability. Consequently, the calibration of the tensiometer readings against soil moisture content is unnecessary. The moisture tension in soil varies with the moisture content, the soil particle size and the packing of the soil. In any given position, the last two factors tend to remain constant so that variations in soil moisture tension reflect the changes in moisture content.

When the soil is at field capacity, that is holding all the water it can against the gravitational pull, the tension is usually about 3 to 6 cm and it will gradually rise as the soil dries. Addition of water causes a rapid reduction of tension in most soils. With tensions below 30 to 35 cm plants do not suffer generally from water shortage, but growth and yield can be substantially increased if soil is maintained near the field capacity reading. With tensions of less than 3 to 5 cm, waterlogging and deficient drainage are indicated.

SPECIFICATION

The tensiometer comprises a porous pot connected by a union and brass tube to a 6 cm vacuum gauge calibrated 0–60 cm Hg. Each tensiometer is tested at our works and is despatched filled with water, the porous pot being enclosed in a waterproof wrapping to prevent loss of water by evaporation during transit and storage. When in use the gauge is protected from chemical sprays and water by a bright red polythene cover.

SH-080

SOIL MOISTURE TENSIOMETER, *Gallenkamp*, **growers' model,** as specification, for maximum depth of 30 cm. Filled with water ready for use, with cover and instructions ... ... Each **£5. 10. 0.** *b*

SH-085

SOIL MOISTURE TENSIOMETER, *Gallenkamp*, **bench model,** for use in shallow benches or troughs, as specification, but with L-shape stem. Filled with water ready for use, with cover and instructions.

Each **£6. 5. 0.** *b*

SH-090

SOIL MOISTURE TENSIOMETER, *Gallenkamp*, **orchard model,** as specification, for maximum depth of 60 cm. Filled with water ready for use, with cover and instructions ... ... Each **£5. 16. 0.** *b*

REPLACEMENT PARTS

SH-101	**Porous pot, in waterproof cover.**	Dozen £4. 4. 0.	Each £0. 8. 0.	*b*
SH-102	**Top washer, rubber.**	Gross £1. 16. 0.	Dozen £0. 4. 6.	*b*
SH-103	**Bottom gasket, rubber.**	Dozen £0. 9. 9.	Each £0. 2. 6.	*b*
SH-104	**Protective cover, red polythene.**	Dozen £3. 8. 0.	Each £0. 6. 10.	*b*

ACCESSORIES

SH-106	**Filler,** a screw capped plastics bottle with a flexible tube for topping up tensiometers.	Dozen £1. 3. 0.	Each £0. 3. 6.	*b*
SH-107	**Spanner,** $\frac{3}{16}$ in. Whitworth, for unscrewing both connections of tensiometers ...		Each £0. 2. 6.	*b*
SH-108	**Soil auger,** steel, 4 cm dia., 90 cm overall length, with 12 mm dia. shaft and welded cross handle.		Each £3. 8. 0.	*b*

All items on this page normally available from stock.

SOIL CONDUCTIVITY

SH-120

SOIL SALTS CONDUCTIVITY BRIDGE, *Electronic Switchgear*, **Type MC4.** A portable, transistorised, battery operated instrument for measuring the soluble salt content of soils in the range 0–100 CF (Conductivity Factor) units. CF measurements give a valuable guide to fertilization requirements, and the quantity and quality of water for effective irrigation. A beaker cell, with constant K = 1·0 and sample volume approximately 12 ml, plugs into the side of the instrument. Complete with one cell, cell cleaning brush, thermometer 0–50°C, sample settling bottle, water measuring cylinder and one *Ever Ready* Type PP4 battery.
Without carrying case ... ... Each **£36. 0. 0.** *fN*

REPLACEMENT PARTS AND ACCESSORY

SH-122	**Measuring cylinder**	Each **£0. 10. 6.**	*fN*
SH-123	**Sample settling bottle**	Each **£0. 2. 6.**	*fN*
EJ-057	**Cell, CJ/10**	For prices see entries in List No. sequence.	
EJ-058	**Thermometer, without case** ...		
EJ-059	**Carrying case**		

SOIL TESTING OUTFIT

When certain soils are shaken with water they yield suspensions which take several hours to settle. By addition of a finely divided insoluble substance such as barium sulphate, the suspended soil particles are carried down with the settling $BaSO_4$ particles thereby leaving a clear supernatant liquid ready for pH measurement with the pH indicator included in the outfit.

SH-140

SOIL TESTING OUTFIT, *BDH*, comprising a polished wooden cabinet with twelve test tubes, 100 g $BaSO_4$, 100 ml *BDH* soil pH indicator, 500 ml distilled water, a small spatula and a pH colour chart. Each **£4. 15. 0.** *m*

REPLACEMENT PART

SH-145 **Soil pH indicator,** *BDH*, **in 100 ml polythene bottle.**
Each **£0. 4. 0.** *m*

SOIL HYDROMETERS

SH-160

HYDROMETER, soil, Road Research Laboratory pattern, to BS 1377 Test 6D, for determining particle size distribution in soils. Calibrated at 20°C.

Type	Short stem	Long stem	
Overall length	265	345	
Range	0·990 – 1·010	0·995 – 1·030	
Each	**19/6**	**19/6**	*a*

SH-165

HYDROMETER, Bouyoucos, to ASTM D422, shot weighted, range 0 to 60 g/litre calibrated at 67°F. Overall length 28 cm ... ... Each **£1. 7. 6.** *a*

SH-167

HYDROMETER JAR, Bouyoucos, with two marks at 1130 and 1205 ml, height 458 mm, diam 70 mm.
Each **£0. 19. 6.** *a*

SH-120

SOIL THERMOMETERS

SH-210

THERMOMETERS, sheathed, soil temperature, comprising solid stem mercury thermometer fused into a stout glass tube with the bulb embedded in a layer of paraffin wax to ensure correct readings on drawing thermometer to surface. Scale span −5 to +40°C divided to 0·5°C. For use with steel tubes SH-215 driven into the soil ... ... Each **£5. 0. 0.** *mN*

ACCESSORIES

SH-215 **Steel tubes, seamless, with copper cap and length of chain for suspending thermometer SH-210 in the tube at the required depth.**

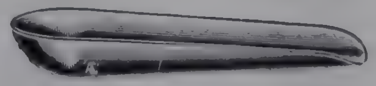
For use at	30	120 cm depth	
Each	£2. 10. 0.	£3. 10. 0.	*mN*

Other apparatus for soil testing will be found under the following page headings:

- Density
- Mills
- Moisture
- Particle Size
- Sample Dividers
- Sieves

Items on this page normally available from stock except those coded ***N.***

SPATULAS, SCOOPS AND SPOONS



SJ-050, SJ-055

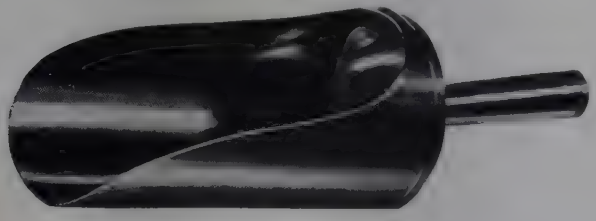
SJ-050
SCOOP, aluminium, length 10 cm.
Dozen **£2. 9. 0.** Each **£0. 5. 6.** c

SJ-055
SCOOP, pure nickel, overall length 7·5 cm.
Dozen **£2. 17. 0.** Each **£0. 6. 0.** c

SJ-060

SJ-060
SCOOPS, rigid PVC. Strong tough scoops for handling dry corrosive chemicals.

Length	19	26·5	36 cm	
Each	9/–	10/–	12/6	c

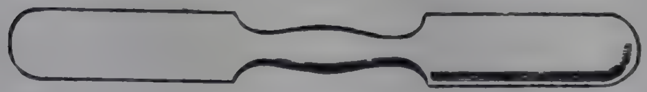


SJ-080

***SJ-080**
SCOOPS, stainless steel, cylindrical, with hollow stainless steel handle.

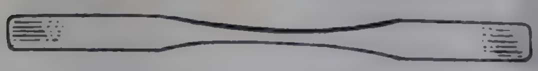
Length of base	10	15	20	23 cm	
Overall length	19	26	32	35 cm	
Each	12/–	16/9	22/6	28/–	m

SCOOPS, glass, see **WEIGHING ACCESSORIES.**



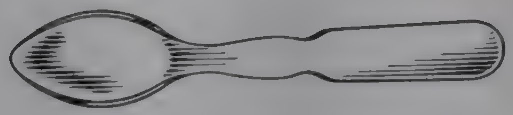
SJ-122

SJ-122
SPATULA, horn, polished and flexible with thin rounded ends, length 10 cm approximately.
Dozen **£1. 16. 0.** Each **£0. 4. 6.** c



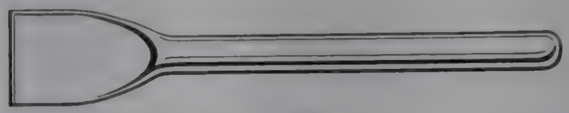
SJ-124

SJ-124
SPATULA, palette knife, horn, polished and flexible, length 15 cm approximately.
Dozen **£2. 14. 0.** Each **£0. 5. 10.** c



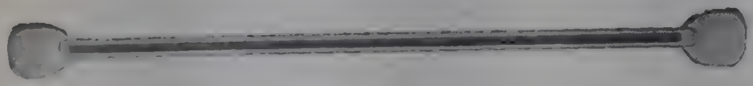
SJ-130

SJ-130
SPATULA, horn, rigid, with spoon end, length 15 cm approximately. Dozen **£4. 4. 0.** Each **£0. 8. 0.** c



SJ-150

SJ-150
SPATULA, polythene, flexible, with one blade. Length 12·5 cm approximately.
Gross **£2. 15. 0.** Dozen **£0. 5. 10.** c



SJ-155

SJ-155
SPATULA, polythene, with metal insert in handle and blade at each end. Also suitable for use as a stirrer. Length 22 cm. Dozen **£3. 4. 0.** Each **£0. 6. 6.** c

SJ-180

SJ-180
SPATULAS, pure nickel, lightweight, flat with rounded ends.

Overall length	9	15 cm	
Dozen	21/–	38/–	m
Each	3/4	4/7	

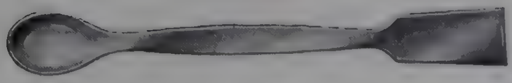
SJ-190

SJ-190
SPATULA, Nuffield pattern, pure nickel. With scoop one end and angled blade the other. Overall length 12·8 cm ... ... Dozen **£1. 18. 0.** c

SJ-195

SJ-195
SPATULA, stainless steel. One end has a deep offset spoon which can reach any part of the common sizes of reagent bottles. The other end has a chisel type blade with one square and one rounded corner suitable for scraping adherent material or lifting single particles. A cranked channel section handle provides rigidity and convenient holding. Length 9 cm.
Dozen **£4. 0. 0.** Each **£0. 7. 10.** m

All items on this page normally available from stock.

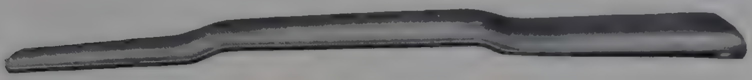


SJ-200

SJ-200

SPATULAS, pure nickel, heavyweight, with one spatulate end and one spoon end.

Overall length	15	21 cm	
Dozen	49/–	68/–	m
Each	5/6	6/10	



SJ-205

SJ-205

SPATULA, stainless steel, double ended, scooped, 17·5 cm long, 19 mm wide at one end and 11 mm at the other ... ... Each **£0. 3. 6.** *m*

SJ-210, SJ-212

SJ-210

SPATULAS, Chattaway pattern, pure nickel.

Overall length	10	15	20 cm	
Dozen	33/–	38/–	41/–	m
Each	4/3	4/7	4/10	

SJ-212

SPATULAS, Chattaway pattern, stainless steel.

Overall length	10	15	20 cm	
Dozen	33/–	38/–	41/–	m
Each	4/3	4/7	4/10	

SJ-214, SJ-216

SJ-214

SPATULA, micro, Chattaway pattern, pure nickel. Overall length 15 cm.
Dozen **£1. 10. 0.** Each **£0. 4. 0.** *m*

SJ-216

SPATULA, micro, Chattaway pattern, stainless steel. Overall length 15 cm.
Dozen **£1. 10. 0.** Each **£0. 4. 0.** *m*

SJ-250

SJ-250

SPATULAS, palette knives, with stainless steel parallel sided, flexible blade set in wood handle.

Blade length	10	15	20	25	30 cm	
Dozen	80/–	96/–	125/–	170/–	250/–	c
Each	7/10	9/–	11/3	15/6	23/–	

SJ-255

SJ-255

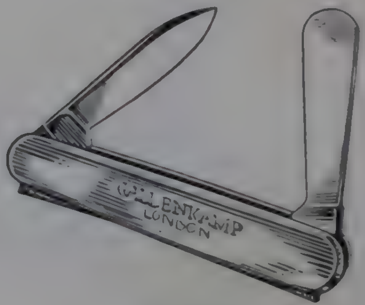
SPATULAS, palette knives, with stainless steel tapered sided, flexible blade, set in wood handle.

Blade length	7·5	10	15 cm	
Dozen	78/–	78/–	102/–	c
Each	7/8	7/8	9/6	

SJ-260

SJ-260

SPATULA, filling knife, with 5 cm wide carbon steel blade set in wood handle. Blade length 13 cm.
Dozen **£4. 18. 0.** Each **£0. 9. 0.** c



SJ-330

SJ-330

SPATULA and pocket knife, combined, with stainless steel blades. Overall length, closed 8 cm, open 18 cm.
Dozen **£11. 15. 0.** Each **£1. 1. 6.** c

SJ-400

***SJ-400**

VIBRO-SPATULA, *Mettler,* for rapidly measuring out powdered materials accurate to 0·1 mg thereby improving the accuracy and rapidity of weighings with *Mettler* and other balances. Vibration is started by pressure on a button on the handle which houses the electrically operated vibrator. Amplitude is varied by adjusting a milled ring on the spatula stem. With three sizes of interchangeable spatula blades. For 100/110 or 200/250V a.c. supplies ... ... Each **£7. 10. 0.** *m*

When ordering please state voltage and nature of supply.

SPECIMEN bottles see BOTTLES
boxes see BOXES and BIOLOGICAL SCIENCES
jars see JARS
tubes see TUBES
SPECTACLES see CLOTHING, PROTECTIVE
SPECIFIC GRAVITY see DENSITY and HYDROMETERS

All items on this page normally available from stock.

SECTION INDEX

SPECTROMETERS

Student spectrometer 698
Direct reading wavelength spectrometer 698

SPECTROSCOPES

Pocket diffraction spectroscopes 699
Reading diffraction spectroscopes 699
Prism spectroscopes 699
Wavelength prism spectroscopes 699
Hartridge spectroscopes 699

SPECTROPHOTOMETERS

Unicam SP 200 703
Unicam SP 500 701
Unicam SP 600 700
Unicam SP 700 702
Unicam SP 800 704
Unicam SP 1200 703
Unicam SP 90 705

SPECTROMETERS

SK-020

STUDENT SPECTROMETER

A simple table spectrometer for demonstrating the more important experiments in spectroscopy. The instrument has a divided circle 15 cm diameter reading the rotation of the telescope by vernier to 1 minute. The telescope of 15 cm focal length and 20 mm aperture is fitted with an adjustable eyepiece and the collimator of 15 cm focal length and 20 mm aperture is provided with an adjustable slit fitted with a reducing wedge. The prism table of 55 mm diameter is divided on the edge for minimum deviation setting.

SK-020

SPECTROMETER, student model, *B & S*, as specification ... ... Each **£55. 0. 0.** *f*

SK-050

DIRECT READING WAVELENGTH SPECTROMETER

For use in the visible spectrum, the ultraviolet and infrared. The accuracy of reading is about 1Å between 4000 Å and 5500 Å and 3 Å to 6 Å up to 8000 Å.

CHARACTERISTICS

A dense flint prism of approximately 1·76 refractive index is used and gives a high dispersion over the visible spectrum. The ultraviolet spectrum can be investigated down to 2000 Å using either a fluorescent eyepiece or a camera which also may be used for photography in the visible region. The silica prism covering bands down to 2000 Å is used also for investigations in the near infrared to 40,000 Å. For the far infrared a rocksalt prism is introduced. The spectrometer may be used with sodium or mercury discharge lamps.

SK-050

SPECTROMETER, WAVELENGTH, *B & S*, direct reading, with flint glass prism, shutter eyepiece and cross wires ... ... Each **£236. 0. 0.** *f*

ACCESSORIES

SK-052	**Slica prism,** range 2000 to 40,000Å.	Each **£54. 0. 0.**	*f*
SK-053	**Rocksalt prism,** range 7000 to 100,000Å.	Each **£30. 0. 0.**	*f*
SK-054	**Divided sleeve,** to fit micrometer drum, for use with SK-052 and SK-053. Readings from calibration tables.	Each **£15. 2. 6.**	*f*
SK-056	**Divided sleeve,** to fit micrometer drum and reading directly to 2000Å using silica prism SK-052.	Each **£15. 2. 6.**	*f*
SK-057	**Fluorescent eyepiece,** to replace standard eyepiece for examination of UV spectra	Each **£14. 15. 0.**	*f*
SK-059	**Slit rods,** to carry auxiliary apparatus on spectrometer.	Pair **£7. 10. 0.**	*f*

Sodium and mercury discharge lamps see LAMPS.

POCKET SPECTROSCOPES

SK-100

SPECTROSCOPE, POCKET DIFFRACTION, *Beck*, for students and general purposes, having a dispersion of 11°. The slit is of fixed width, protected by a glass cover to prevent dust from entering. With adjustable eyepiece for focusing the spectrum accurately. With case.
Each **£5. 10. 0.** *fS*

SK-105

SPECTROSCOPE, POCKET DIFFRACTION, *Beck*, similar to SK-100 but with the addition of an adjustable slit which adds to its utility. It readily shows the Fraunhofer lines and rain bands. With case.
Each **£17. 10. 0.** *f*

SK-110

SPECTROSCOPE, READING DIFFRACTION, *Beck*, for medical research, analytical work and for general purposes in a physical laboratory. The dispersion is 17° and the slit is provided with an adjustment. A drum graduated in 100 arbitrary divisions by which the spectrum can be moved across the field and used in conjunction with an indicator, enables readings to be taken. An adjustment is fitted for accurately focusing the spectrum. With case ... ... Each **£25. 0. 0.** *f*

SK-130

SPECTROSCOPE, WAVELENGTH, PRISM, *Beck*, for taking readings in wavelengths and having a dispersion of 10°. Scale reading is viewed in the same field as the spectrum, each division of the scale representing 100 Å. An adjustable slit and a control for focusing are provided. There is an adjustment for the scale so that it can be set accurately in relation to the spectrum. With case.
Each **£35. 0. 0.** *f*

SK-132

SPECTROSCOPE, WAVELENGTH, PRISM, *Beck*, as SK-130 but with a comparison prism for simultaneously examining the spectra from two sources. With case.
Each **£39. 0. 0.** *f*

HARTRIDGE REVERSION SPECTROSCOPE

For the accurate spectroscopic examination of haemoglobin.

PRINCIPLE

The reversion method in which two spectra are produced, one above the other, but with the colours reversed, ensures great accuracy in setting. By means of an adjusting screw, one spectrum moves across the other in an opposite direction, so that an absorption band or an emission line in one spectrum can be set to coincide with the same band, or line, in another spectrum.

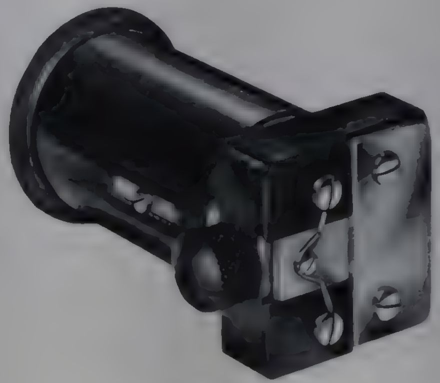
OPERATION

The scale covers the range from 3000 to 7000 Å, each division of the micrometer drum representing 1 Å. The slit is symmetrical and the width is controlled by the rotation of a ring which is graduated in ·001 in. A cylindrical condensing lens in front of the slit concentrates the light so that the whole slit aperture is filled.

SK-200

SPECTROSCOPE, Hartridge reversion, *Beck*, as specification. Without holders, troughs, illuminating lamp or carrying case ... ... Each **£63. 0. 0.** *f*

SK-100



SK-105

SK-110

SK-130

SK-230

SPECTROSCOPE OUTFIT, Hartridge Reversion, *Beck*, comprising:

Spectroscope, SK-200.
Stand, with illuminating lamp and flex.
Holder, for glass troughs.
Holder, for two test tubes.
Holder, for two test tubes and two boiling tubes.
Troughs, fused glass, width 5 mm, pair.
Troughs, fused glass, width 10 mm, pair.
Baffle plate, for cutting out extraneous light.
Case, mahogany, to contain spectroscope and accessories.

Outfit **£117. 10. 0.** *f*

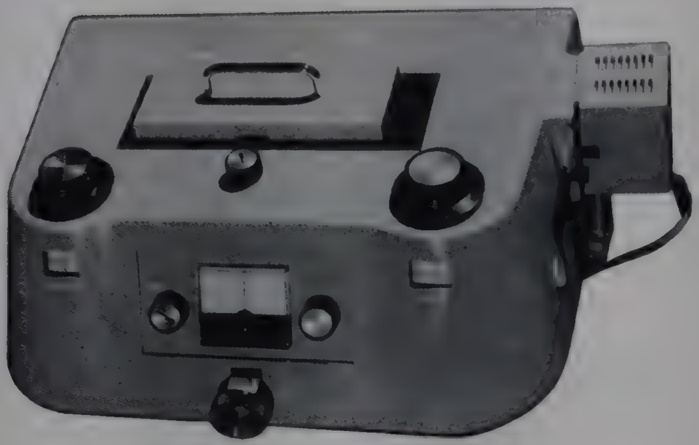
Items on this page coded *S* **normally available from stock.**

SP. 600 SPECTROPHOTOMETER

361-1000 mμ

For manually operated transmission and absorption measurements

Single beam



SL-510

Two vacuum-type photocells are fitted, sensitive to the red and blue ends of the spectrum respectively. The amplified output from these photocells is either balanced across a potentiometer calibrated linearly in percentage transmission and logarithmically in optical density, or read on a 10 mV potentiometric recorder.

The system combines maximum stability with a high degree of accuracy.

TECHNICAL DATA

Range	335–1000 mμ (calibrated 330–1020 mμ) with accessory SL-524
Source	Prefocused tungsten filament
Monochromator	Littrow type with 60° glass prism
Wavelength accuracy	±0·2 mμ at 360 mμ ±1·5 mμ at 600 mμ ±6·0 mμ at 1000 mμ
Photometric accuracy	±1%T
Photometric reproducibility	Within ±0·5%T
Resolution	Better than 3 mμ over most of range
Stray light	Less than 1% throughout range
Dimensions and weight	24 × 16 × 10 in 55 lb 600 × 400 × 250 mm 25 kg
Power requirements	Internal dry cells together with a 12V external supply from accumulator. Accessories are listed for mains operation

- **High quality Littrow monochromator with glass prism**
- **Sensitive vacuum photocell detector and self-contained amplifier**
- **Solid, all-cast construction, unitised for easy maintenance**
- **Minimum number of controls arranged for maximum convenience**
- **Choice of null balance or recorder output**
- **Quartz-iodine lamp accessory available to extend range to 335 mμ**

SL-510

SPECTROPHOTOMETER, *Unicam* **SP.600,** as specification, with four 10 mm fused glass cells, for operation on 12V d.c. ... ... Each **£275. 0. 0.** *fS*

ACCESSORIES

SL-511 **Power supply unit SP.649** to replace dry batteries. Each **£15. 0. 0.** *fS*

SL-512 **Transformer,** constant voltage model **SP.651,** 12V output, for operation on 190/260V 50 Hz single phase supplies ... ... Each **£10. 10. 0.** *fS*

SL-513 **Cells, fused glass,** with lid.

Light path	1	2	5	10	20	40 mm	
Each	58/-	58/-	56/-	50/-	60/-	80/-	*fS*

SL-514 **Microcell holder SP.680.** A self-contained four-position cell holder with lens, for use where sample volume is limited. Provides 10 mm light path with 0·45 ml sample. **Supplied without microcells** ... Each **£47. 10. 0.** *f*

SL-516 **Microcell,** 10 mm fused glass, with lid. Each **£2. 0. 0.** *fS*

SL-518 **Microcell,** 20 mm fused glass, with lid. Each **£2. 10. 0.** *f*

SL-520 **Test tube holder SP.630.** A four-position holder for ½ in. test tubes. For use (e.g. clinical) where speed is desirable but high level of accuracy not necessary. Minimum capacity per tube is 3 ml. Supplied with four laboratory grade test tubes ... Each **£11. 0. 0.** *f*

SL-522 **Autocell SP.625** ... ... Each **£42. 10. 0.** *f*

SL-524 **Quartz-iodine lamp SP.652** on prefocus base. Required to extend wavelength range down to 335 mμ. Each **£3. 0. 0.** *f*

SL-556 **Recorder SP.22.** For details and price see entry in List No. sequence.

NOTE: SL-524 can be fitted by the user only to models manufactured after January 1967. Such models are identified by the wavelength scale being calibrated 330 to 1020 mμ.

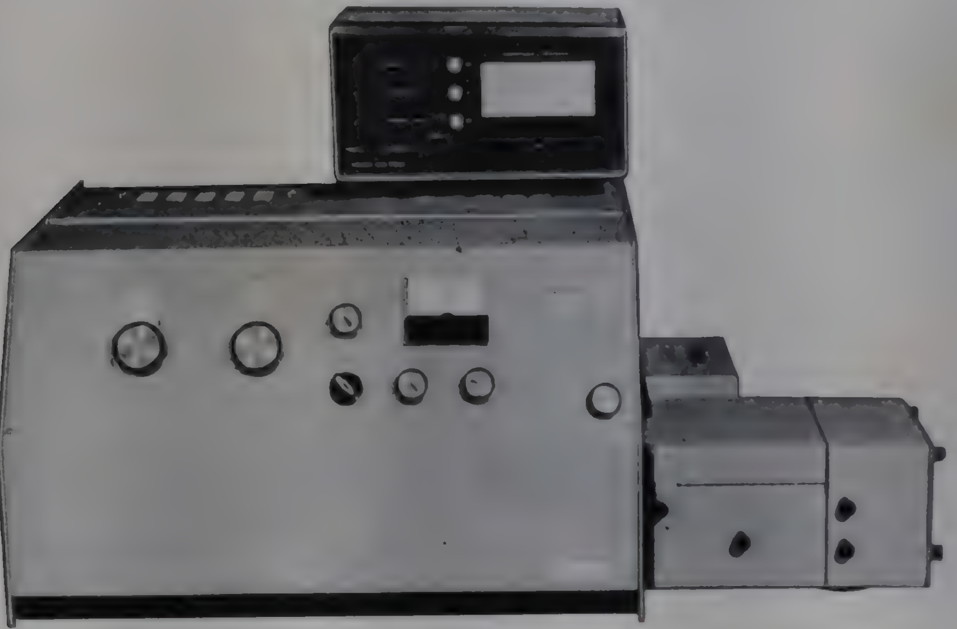
Gallenkamp **COLORIMETER** for clinical and metallurgical determinations in the visible light range. See CS-200 in List No. sequence.

Items on this page coded *S* **normally available from stock.**

SP.500 SERIES 2 SPECTROPHOTOMETER

186-1000 mμ

For high accuracy quantitative determinations in the ultraviolet and visible region of the spectrum.



SL-530

- **High accuracy**
- **Null balance or direct readout**
- **Full range of automation accessories including recorder**

The SP.500 series 2 is based on the well proven optical system of the SP.500 and now forms the basis of a new system. The basic instrument operates with either a null balance readout or direct reading meter. It can be used with the pen recorder SL-556 and the automation system for cell changing SL-550 with SL-551.

TECHNICAL DATA

Range	186–1000 mμ
Sources	Air-cooled deuterium arc and tungsten filament lamp. Automatic lamp selection by wavelength with manual override
Slits	Bilateral curved slits, continuously variable up to 2 mm
Monochromator	Littrow type with 30° high-purity silica prism
Detectors	VS39 or IRV4 (red sensitive) and QVA39 or UVV4 (blue sensitive) photocells
Wavelength accuracy	±0·2 mμ at 200 mμ ±1·0 mμ at 400 mμ ±2·5 mμ at 600 mμ
Photometric accuracy	±0·3%T (null-balance mode)
Photometric reproducibility	±0·1%T
Resolution	0·5 mμ (200–400 mμ) 1·0 mμ (400–800 mμ)
Stray light	Less than 0·2% at 200 mμ
Electronics	Fully transistorised, printed circuit board construction
Presentation	Switch-selection of potentiometric null-balance operation or direct meter readout, calibrated in transmittance and absorbance units. Recorder output suitable for use with SL-556 or other 10 mV recorders
Dimensions	35× 17× 21·5 in 890× 450× 550 mm
Power requirements	200/250V, 50/60 Hz (300VA max) 100/120V, 50/60 Hz

SL-530
SPECTROPHOTOMETER, *Unicam* **SP.500 Series 2,** as specification. Complete with holder for cells 1 mm to 40 mm path length, tungsten lamp, deuterium arc lamp, red and blue sensitive photocells, amplifier, null-indicating system, direct read-out system, built-in power supplies, dust cover and instruction manual ... Each **£925. 0. 0.** *f*
Price includes installation in U.K. only.

When ordering please state voltage and nature of supply.

ACCESSORIES

SL-533 **Cells,** fused, silica, with lid.

Light path	1	2	5	10	20	40 mm	
Each	**110/–**	**110/–**	**96/–**	**90/–**	**110/–**	**126/–**	*fS*

SL-513	**Cells,** fused glass	For prices see entries in List No. sequence.	
SL-516	**Microcell,** fused glass		
SL-518	**Microcell,** fused glass		
SL-536	**Microcell holder**	Each **£7. 10. 0.**	*f*
SL-537	**Cell,** fused silica, cylindrical, light path 10 cm.	Each **£13. 10. 0.**	*f*
SL-539	**Cell holder,** for SL-537	Each **£6. 16. 0.**	*f*
SL-544	**Diffuse reflectance attachment SP.540,** including magnesium carbonate reference standard and sample compartment	Each **£62. 10. 0.**	*f*
SL-546	**Fluorimeter attachment SP.550,** for nephelometry. Fluorescent light leaves the solution at right angles to the exciting beam	Each **£92. 0. 0.**	*f*
SL-547	**Bracket SP.555,** for SL-546 and photocell housing.	Each **£9. 5. 0.**	*f*
SL-550	**Programme controller SP.505** ...	Each **£160. 0. 0.**	*f*
SL-551	**Automatic cell changer SP.506,** for use with SL-550.	Each **£57. 0. 0.**	*f*
SL-554	**Automatic sample changer SP.40.**	Each **£250. 0. 0.**	*f*
SL-556	**Recorder SP.22,** linear/log strip chart, 10 mV full scale sensitivity. Absorbance range 0 to 1 or 0 to 0·5. Motor speed 4, 6 or 10 rev/min	Each **£320. 0. 0.**	*f*

When ordering please state voltage and nature of supply, motor speed and absorbance range required.

A full range of accessories including constant temperature cell housings, and an electrophoresis strip scanner are available. Full details on application.

Items on this page coded *S* normally available from stock.

SP. 700 SPECTROPHOTOMETER

Model A wavelength 186 mμ - 3·57 μ   Model C wavenumber 54,000 cm^{-1} - 2,800 cm^{-1}

For double-beam ratio-recording transmission and absorption measurements

SL-561

- **Very wide spectral range**
- **Double beam ratio recording for highest accuracy**
- **Five transmittance and three absorbance scales plus single beam**
- **Multipotentiometer system for controlling 100% line profile**
- **Five scan speeds and three chart speeds for flexible presentation**
- **Large sample compartment completely accessible from three sides**

Designed to give a high degree of resolution and accuracy throughout a very wide range. The sources, dispersing elements, filters and detectors have been chosen to provide optimum performance with highest energy in the ultraviolet, visible and near infrared regions of the spectrum.

The basic instruments are available calibrated linearly in wavelength or wavenumber. Scan speeds are variable by factors of three giving a total possible reduction of 81 : 1 on the fastest speed, and all instruments have a fast reverse drive. No accessory is required for fixed wavelength or wavenumber studies.

TECHNICAL DATA

Double beam ratio recording spectrophotometer, using a strip chart recorder with variable scales. A Littrow monochromator is fitted with 30° back silvered ultraviolet grade silica prism for the range 186 mμ–2·5 μ and 7500 l.p.i. replica grating with order sorting filters for range 2·5–3·57 μ.

Range	SP700A linear wavelength 186 mμ — 3·57 μ SP700C linear wavenumber 54,000 cm^{-1} —2,800 cm^{-1}
Photometric accuracy	±0·5% transmission
Photometric reproducibility	±0·25%T with 110%T full scale ±0·05%T with 11%T full scale
Presentation	Switch selection for linear transmittance, linear absorbance or energy (single beam) recording against linear wavelength (order SP700A) or linear wavenumber (order SP700C)

0—220%T	0—1·1A
0—110%T	0·9—2·0A
0—22%T	−0·3—+0·8A
0—11%T	Energy
80—102%T	

Stray light	Less than 1% at 50,000 cm^{-1}, (200 mμ) Less than 0·1% over most of the range
100% line stability	±1% throughout range
Power supply	All mains operated with separate power supply unit.

SL-561

SPECTROPHOTOMETER, *Unicam* **SP.700A,** as specification, with linear wavelength range 186 mμ–3·57 μ. Complete with tungsten lamp and deuterium arc lamp, photomultiplier and lead sulphide cell, power supply unit, recorder with three rolls of chart paper and set of three spare pens, four stoppered glass 10 mm cells and two stoppered silica 10 mm cells in cases, two standard cell holders, dust cover for main instrument and operating manual. For 180/250V a.c. single phase supplies.
Each **£3370**. **0**. **0**. *f*

SL-563

SPECTROPHOTOMETER, *Unicam* **SP.700C,** as SP.700A but with linear wavenumber range 54,000–2800 cm^{-1} ... ... Each **£3250**. **0**. **0**. *f*

Price includes installation in U.K. only.

Other voltages and frequencies available to order.

When ordering please state voltage and nature of supply.

ACCESSORIES

SL-564	**Variable pathlength cell holder.**	Price on application.
SL-566	**Microcell holder**	Each **£8. 4. 0.** *f*
SL-513	**Cells, fused glass**	For prices see entries in List No. sequence.
SL-516	**Microcell, fused glass** ...	
SL-518	**Microcell, fused glass** ...	
SL-533	**Cells, fused silica**	

Models SP700AT and SP700CT for measurements in per-cent transmission available to special order.

SP. 200 SERIES SPECTROPHOTOMETERS

A range of simple and inexpensive infrared spectrophotometers

- **Choice of three instruments**
- **Flat bed recording system**
- **Linear wavenumber scales**
- **Simple operating controls**

TECHNICAL DATA AND ORDERING SPECIFICATIONS

Model SP.200, 650–5000 cm^{-1}

Wavenumber accuracy	± 2 cm^{-1} at 650 cm^{-1} ± 4 cm^{-1} at 1000 cm^{-1} ±28 cm^{-1} at 3000 cm^{-1}
Wavenumber reproducibility	± 1 cm^{-1} at 650 cm^{-1} ± 2 cm^{-1} at 1000 cm^{-1} ±14 cm^{-1} at 3000 cm^{-1}
Photometric accuracy	±1%T from 100% to 5%T
Reproducibility	±0·5%T
Stray light	Less than 5% at 650 cm^{-1}
Resolution	Better than 5 cm^{-1} at 1400 cm
Charts	Single chart, linear wavenumber, dual scale 650–2000 cm^{-1} graduated 75 cm^{-1} steps. 2000–5000 cm^{-1} graduated 300 cm^{-1} steps

SL-580

SPECTROPHOTOMETER, *Unicam* **SP.200**, as specification, complete with 2·5 mm Nernst source, 60° rocksalt prism in thermostatic compartment, variable slit programme. Golay pneumatic detector and flat bed recorder. Includes also chart paper, instructions manual, polystyrene calibrator, set of fuses, one spare pen and a measuring rule. **Without cells.** For 180/250V 50 Hz single phase supplies. Price U.K. each **£1245. 0. 0.** *f*
Price of export model on application.

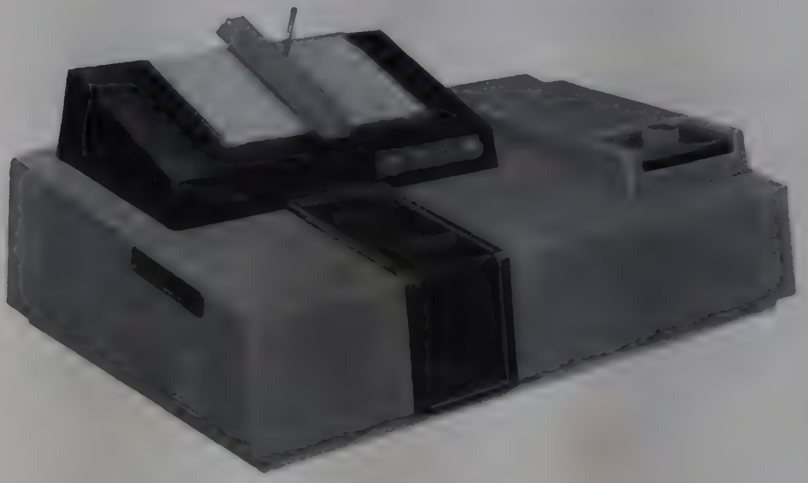
Model SP.200G, 650–4000 cm^{-1}

Wavenumber accuracy	±2 cm^{-1} at 1000 cm^{-1} ±4 cm^{-1} at 3000 cm^{-1}
Wavenumber reproducibility	±1 cm^{-1} at 1000 cm^{-1} ±2 cm^{-1} at 3000 cm^{-1}
Photometric accuracy	±1%T from 100% to 5%T
Reproducibility	±0·5%T
Stray light	Less than 2%
Resolution	Max. 1 cm at 1000 cm^{-1} 3 cm at 3000 cm^{-1}
Charts	2 charts 650–2000 cm^{-1} 1300–4000 cm^{-1}

SL-582

SPECTROPHOTOMETER, *Unicam* **SP.200G,** as specification, complete with 2·5 mm Nernst source, rotating mirror beam switch, monochromator with four filters and two gratings, Golay pneumatic detector and flat bed recorder. Includes chart paper, instructions manual, polystyrene calibrator, set of fuses, measuring rule and one spare pen. **Without cells.** For 180/250V 50 Hz single phase supplies. Price U.K. each **£1700. 0. 0.** *f*
Price of export model on application.

The SP.200 series of instruments provides a choice of three superbly engineered infrared spectrophotometers to meet various requirements.



SL-580

Model SP.1200, 400–4000 cm^{-1}

Wavelength accuracy	±1·5 cm^{-1} at 1000 cm^{-1} ±4·5 cm^{-1} at 3000 cm^{-1}
Wavelength reproducibility	±1 cm^{-1} at 1000 cm^{-1} ±3 cm^{-1} at 3000 cm^{-1}
Photometric accuracy	±1%T from 100% to 5%T
Reproducibility	±0·5%T
Stray light	Less than 4% at 4010 cm^{-1}
Resolution	1 cm at 1000 cm^{-1} 3 cm at 3000 cm^{-1}
Charts	2 charts 400–1300 cm^{-1} 1200–4000 cm^{-1}

SL-585

SPECTROPHOTOMETER, *Unicam* **SP.1200,** as specification, complete with 4 mm Nernst source, rotating mirror beam switch, monochromator with four filters and two gratings, Golay pneumatic detector and flat bed recorder. Includes chart paper, instructions manual, polystyrene calibrator, set of fuses, measuring rule and one spare pen. **Without cells.** For 180/250V 50 Hz single phase supplies ... ... Each **£2175. 0. 0.** *f*

ACCESSORIES FOR SP.200 SERIES SPECTROPHOTOMETERS

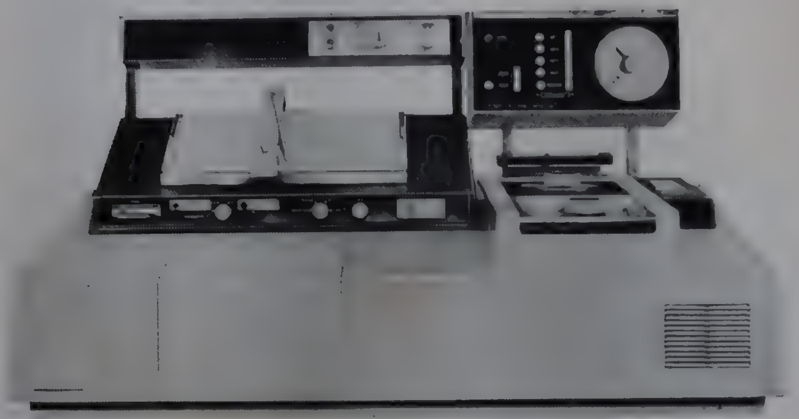
SL-587	**Scale expansion accessory SP.250,** giving expansion of the transmittance scale by factors of ½ to 20, complete with potentiometer, back-off facilities and instructions for fitting ... ... Each **£115. 0. 0.**	*f*
SL-590	**Recorder SP.20,** strip chart with 10 mV full scale sensitivity. Motor speed 4, 6 or 10 rev/min. Each **£272. 0. 0.**	*f*
SL-591	**Recorder SP.21,** strip chart/flat bed with 10 mV full scale sensitivity. Motor speed 4, 6 or 10 rev/min. Each **£298. 0. 0.**	*f*

When ordering please state motor speed required, voltage and nature of supply.

SP. 800 SPECTROPHOTOMETER

190 — 850 mμ or 52,500 — 11,500 cm^{-1}

A simple and inexpensive double-beam recording instrument for routine measurements in the ultraviolet and visible regions



SL-595 with SL-600, SL-604, SL-605

A self contained, line operated, double beam recording instrument suitable for a very wide range of applications. The basic instrument is available, calibrated in either wavelength or wavenumber, recording on an integral flat bed recorder. Automation accessories allow the instrument to record at fixed wavelength with up to 4 samples and repeat scan over wavelength. Other accessories include a device for scale expansion on to an external recorder, thermostatted cells, diffuse reflectance attachment for colour measurement and a spectrofluorescence accessory.

TECHNICAL DATA

Double beam, optical null recording spectrophotometer giving linear absorbance scale 0–2·0A. Monochromator comprises a 30° back-silvered ultraviolet grade silica prism in Littrow mounting. Sources comprise tungsten and deuterium lamps with automatic interchange at 370 mμ.

Wavelength range	190—850 mμ or 52,500—11,500 cm^{-1}
Accuracy	±0·2 mμ at 200 mμ ±30 cm^{-1} at 50,000 cm^{-1} ±1·9 mμ at 500 mμ ±80 cm^{-1} at 20,000 cm^{-1}
Reproducibility	±0·1 mμ at 200 mμ ±15 cm^{-1} at 50,000 cm^{-1} ±1·0 mμ at 500 mμ ±15 cm^{-1} at 20,000 cm^{-1}
Photometric accuracy	±0·02 absorbance units
Photometric reproducibility	±0·005 absorbance units
Flatness of A=O line	±0·01 absorbance units
Stray light	Less than 1% at 200 mμ
Resolution	190—370 mμ 0·1—0·4 mμ 370—700 mμ 0·4—2·0 mμ
Scan time	2 or 8 min per chart
Chart size	Foolscap ruled 15×28 cm grid
Sample compartment	25×12×14·5 cm high

SPECTRONIC 20 Spectrophotometer, for details see CS-360 in List No. sequence.

- **Fully automatic recording**
- **Flat bed recorder**
- **Large sample compartment**
- **Second sample position for turbid solutions**
- **Automation system available for kinetic measurements**
- **Linear absorbance scale 0–2·0A with adjustable base line cam**

SL-595

SPECTROPHOTOMETER, *Unicam* **SP.800A, as specification, with linear wavelength scale, standard model range 190—700 mμ.** Complete with deuterium and tungsten sources, fused silica prism in thermostatic compartment, variable slit programme, photomultiplier detector and flat bed recorder. Includes also chart paper and instructions manual. **Without cells.** For 190/250V 50 Hz supplies ... ... Each **£1690. 0. 0.** *f*

SL-596

SPECTROPHOTOMETER, *Unicam* **SP.800B, as SL-595 but with linear wavelength scale, red sensitive model range 190—850** mμ ... Each **£1820. 0. 0.** *f*

SL-597

SPECTROPHOTOMETER, *Unicam* **SP.800C, as SL-595 but with linear wavenumber scale, standard model range 52,500—14,000 cm^{-1}** Each **£1690. 0. 0.** *f*

SL-598

SPECTROPHOTOMETER, *Unicam* **SP.800D, as SL-595 but with linear wavenumber scale, red sensitive model range 52,500—11,500 cm^{-1}**
Each **£1820. 0. 0.** *f*

ACCESSORIES

SL-600 **Scale expansion accessory SP.850.** A plug-in unit for slave recording of absorbance against time at constant wavelength or the expansion of the absorbance scale by factors of ½, 1, 2, 5, 10, 20, etc., and on to DMS cards.
Each **£115. 0. 0.** *f*

SL-602 **Constant temperature cell holder SP.870,** to fit the main cell compartment. Accepts standard cells up to 40 mm and microcells up to 20 mm path length. Temperature control is electrical in the range 30—100°C or by hot water circulation in the range 30—70°C.
Each **£95. 0. 0.** *f*

SL-604 **Constant wavelength/wavenumber scanner SP.820,** scan time 20 min ... ... Each **£94. 0. 0.** *f*

SL-606 **Programme controller SP.825.** Must be used with SL-604 ... ... Each **£165. 0. 0.** *f*

SL-608 **Spectrofluorimeter accessory SP.860.**
Each **£150. 0. 0.** *f*

SL-612 **Diffuse reflectance accessory SP.890.**
Each **£90. 0. 0.** *f*

Details of other accessories on application.

When ordering please state voltage and nature of supply.

SP. 90 SINGLE-BEAM ATOMIC ABSORPTION SPECTROPHOTOMETER

188 — 770 mμ

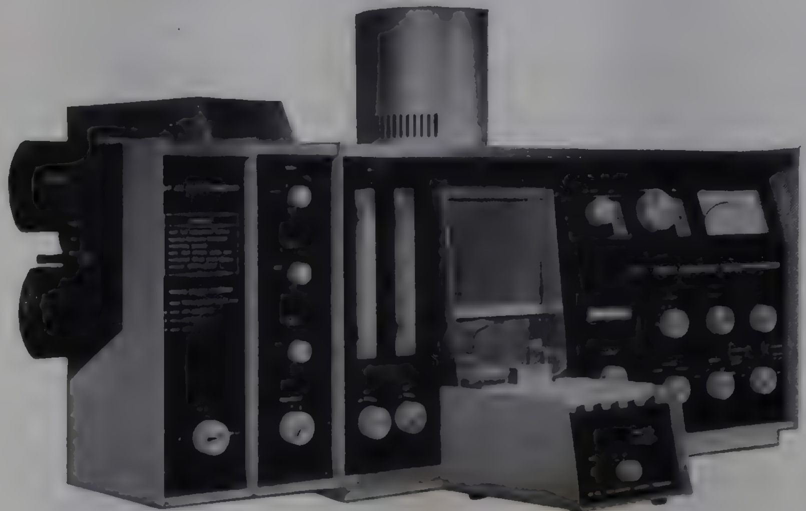
- **Simple self-contained instrument**
- **Optical path specially designed for optimum detection limits**
- **Built-in flame emission system**
- **Meter or recorder presentation**
- **Automatic sampling accessories**

Light of the element to be determined is taken from a hollow cathode lamp source and focused on to a 10 cm slot burner. The sample is taken up into the premix burner chamber and into the flame. The light is analysed by a specially designed large aperture monochromator fitted with a silica prism and adjustable slits up to 2 mm. A photomultiplier detector is used with very stable a.c. electronics to give read out on a taut band meter or a standard 10 mV recorder.

TECHNICAL DATA

Range	188—770 mμ—calibrated 185—855 mμ
Presentation	Taut suspension meter with transmission and absorbance scales. Outlet for recorder.
Wavelength stability	0·06 mμ per °C change in ambient temperature at 300 mμ
Effective dispersion	6 mμ/mm slit width at 250 mμ, 78 mμ/mm at 550 mμ
Electronics stability	Electrical zero drift less than 1% per day Gain drift less than 2% per hour
Scale expansion	Up to 5 x
Sample take-up rate	Normally 3–4 ml/min with air flow 5 l/min.
Dimensions and weight	27·5 × 18·5 × 14·5 in 148 lb 695 × 470 × 370 mm 67 kg
Power requirements	190/260V 50 Hz. Each model will maintain the above specification for all voltages within this range

Unicam SP.90B Atomic Absorption Spectrophotometer range 188—850 mμ. Details and price on application.



SL-630 with SL-632, SL-634, SL-636

SL-630

ATOMIC ABSORPTION SPECTROPHOTOMETER, *Unicam* **SP.90A,** as specification, wavelength range 188—770 mμ complete with fused silica prism monochromator, sampling system, acetylene, propane and emission burner heads, photomultiplier detector, plug-in electronics, stabilised power supply and meter read-out but **without hollow cathode lamps.** For 190/260V 50 Hz single phase supplies. Price includes installation in U.K. only ... ... Each **£940. 0. 0.** *f*

When ordering please state voltage and nature of supply.

ACCESSORIES

SL-632 **Hollow cathode lamp,** complete with holder for any one of the following elements.

Al	Cr	Au	Lu	Pt	Ag	Sn
Sb	Co	Hf	Mg	K	Na	Ti
Ba	Cu	Ho	Mn	Pr	Sr	W
Be	Dy	In	Mo	Re	Ta	U
Bi	Er	Ir	Nd	Rh	Te	V
B	Eu	Fe	Ni	Ru	Tb	Yb
Cd	Gd	La	Nb	Sm	Tl	Y
Ca	Ga	Pb	Os	Sc	Th	Zn
Ce	Ge	Li	Pd	Si	Tm	Zr

Prices on application.

When ordering please specify element to be detected.

SL-634 **Lamp turret, SP.91,** to hold three hollow cathode lamps.
Price, if ordered with SP.90 ... Each **£99. 0. 0.** *f*
Price on application, if ordered separately.

SL-636 **Automatic sample changer SP.92,** comprising a continuous chain of 32 holders to take 4 ml polythene sample cups ... ... Each **£120. 0. 0.** *f*

SL-556 **Recorder SP.22.** For details and price see entry in List No. sequence.

CARE AND MAINTENANCE OF (AG), *QUICKFIT* AND *CLEARFIT* STANDARD JOINT GLASSWARE

(With acknowledgments to Quickfit & Quartz Ltd.)

CLEARFIT JOINTS

These joints, manufactured to BS 572 by a new precision process which obviates the necessity of grinding, are completely interchangeable with ground joints and offer several notable advantages. In particular they are less liable to leakage, require less lubrication and, on account of the smooth surface, suffer less from seizure.

Apart from these points, the notes which follow are relevant in greater or lesser degree to all forms of glass joints and the apparatus of which they form parts.

CARE OF GLASS JOINTS

All joints should be completely free from dirt, as dust may cause leakage and grit may even cause breakage. Therefore, as a matter of routine, before use all joints should be wiped free from foreign matter. After use at elevated temperatures joints should be separated as soon as possible, preferably whilst still warm.

LUBRICATION AND SEIZURE

Lubrication fulfils one or more of three purposes: to prevent leakage, to protect the surface of the joint, to facilitate separation of the joint. For many purposes in preparative organic chemistry, apparatus with glass joints can be used without lubricant, but if lubricant is desirable it can be chosen from the selection in this catalogue under the title LUBRICANTS.

Strong caustic should never be allowed to remain in contact with ground joint surfaces. Its attack on the precision ground faces is quite rapid and if left in an assembled joint it cements it together very effectively and damages the surfaces for future use.

Parting of the joints while apparatus is still warm is recommended for prevention of seizure. When seizure has taken place, separation can sometimes be effected by soaking in a suitable solvent or by localised gentle heating of the socket such as under the stream of hot water from a tap or over a very gentle flame.

CLAMPING

Since conical joints are rigid, only one clamp should be tightened on a piece of apparatus unless flexibility is provided between the clamps by some other form of joint. Supporting rather than clamping should always be the principle with assemblies of glassware. It is usually better to adjust and, where applicable, tighten the jaws of the clamp first and then to adjust and tighten the bosshead on the clamp and finally on the stand.

SCRATCHES

Care should be taken to avoid scratches on the surfaces of glassware as these reduce the mechanical strength of the glass and make it more susceptible to breakage through thermal shock. Scratches sufficient to result in breakage can be made by glass stirrers, by rubbing or knocking two pieces of glassware together, or by the metal stems of cleaning brushes. A common error is to use a glass stirring rod which has not been protected by the fitting of a rubber policeman. Care in handling, cleaning and storage of glassware items will lengthen their life significantly.

CLEANING

Cleaning is much easier to carry out when the residue is new. It is, therefore, recommended that it should be done immediately after use.

Glassware can usually be cleaned simply by washing with hot detergent. Organic material should be removed by a suitable solvent or by the use of dichromate cleaning mixture. With obstinate residues the action of detergent or solvent can be much improved by immersion in an ultrasonic cleaning bath.

TYPES OF JOINT

Conical joints to BS 572 are fitted to all (AG), *Quickfit* and *Clearfit* apparatus. This British Standard conforms to the internationally approved ISO R 383 so as to secure interchangeability among joints produced in most of the major manufacturing countries of the world.

The former BS nomenclature for joint lengths, viz. the A,B,C and D length joints, has been discontinued in favour of the ISO system of two figures separated by an oblique stroke. The first figure represents the large end diameter of the joint in millimetres (rounded to the nearest whole number), the figure after the oblique stroke being the nominal length of ground zone, also in millimetres.

Thus for example:
B 19 is now 19/26 and C 19 is 19/17.

Spherical (ball and cup) joints to BS 2761 also match the draft (not yet finally confirmed) international requirements of ISO DR 714. These joints may be used to introduce a degree of flexibility into a complex system and thus to minimise breakage. They are more easily separated than conical ground joints when used with materials tending to seizure.

Flat flange joints are available in larger diameters than conical or spherical joints and also have the advantages of easy separation.

Screw thread joints comprising glass threads fitted with plastics screw caps and sealing washers provide a convenient means of achieving adjustable depth of insertion for such items as gas or steam entry tubes or thermometers.

BURETTE AND FUNNEL STANDS

SINGLE STAND WITH HARDWOOD HOLDERS

SM-210

STAND, hardwood, single, with base 20×12·5 cm and vertical rod 46×2 cm to take burette holder SM-212 or funnel holder SM-214.
Dozen **£3.10. 0.** Each **£0. 7. 0.** c

SM-212

BURETTE HOLDER, hardwood, for one burette.
Dozen **£3.18. 0.** Each **£0. 7. 8.** c

SM-214

FUNNEL HOLDER, hardwood, for one funnel up to 12 cm diameter.
Dozen **£2.17. 0.** Each **£0. 6. 0.** c

DOUBLE STANDS WITH HARDWOOD HOLDERS

SM-230

STAND, hardwood, double, with base 28×12·5 cm and vertical rod 46×2 cm to take burette holder SM-242, burette/funnel holder SM-243 or funnel holder SM-244.
Dozen **£3.18. 0.** Each **£0. 7. 8.** c

SM-241

STAND, as SM-230 with hardwood rod, but with stoved white epoxide resin finished cast iron base 29×14 cm.
Dozen **£20. 0. 0.** Each **£1.16. 0.** c

SM-242

BURETTE HOLDER, hardwood, for two burettes.
Dozen **£5. 0. 0.** Each **£0. 9. 3.** c

SM-243

BURETTE/FUNNEL HOLDER, hardwood, for one burette and one funnel up to 12 cm diameter.
Dozen **£5.12. 0.** Each **£0.10. 3.** c

SM-244

FUNNEL HOLDER, hardwood, for two funnels up to 12 cm diameter.
Dozen **£3.12. 0.** Each **£0. 7. 2.** c

DOUBLE STAND WITH PRECISION DIECAST BURETTE HOLDER

SM-260

STAND, double, with hardwood base and white technolite top 30×15 cm and plated metal rod 53 cm (21 in), suitable for burette holder SM-290.
Dozen **£29.10. 0.** Each **£2.13. 0.** c

SM-290

BURETTE HOLDER, *Gallenkamp*, for two burettes, providing an instantaneous positive grip and release. The burettes are held firmly and safely in rubber lined jaws without obscuring the graduations. The holder is constructed from diecastings finished in white enamel. The offset mounting of the spring loaded clamp arms prevents downward motion through the clamp. A single thumb screw secures the clamp firmly to rods of ½ in dia. which may be vertical or horizontal.
Dozen **£17.10. 0.** Each **£1.12. 0.** b

REPLACEMENT PARTS

SM-293 **Rubber cushions** ... ... Dozen **£0. 3. 3.** b

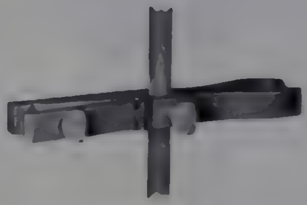
BURETTE STANDS for burettes mounted on 500 ml reservoir bottles see BW-880 and BW-881 in List No. sequence.

For white enamelled cast iron burette stands see SM-402 and SM-403 in List No. sequence.

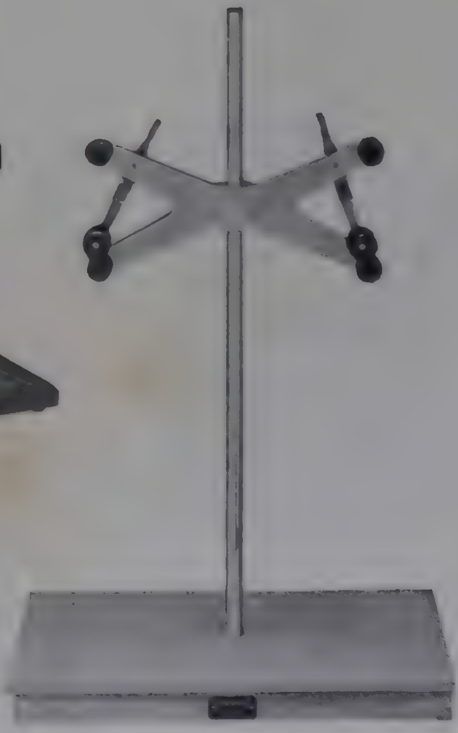
SM-210 with SM-212

SM-214

SM-242


SM-243

SM-230 with SM-244


SM-260 with SM-290

All items on this page normally available from stock.

PIPETTE STANDS AND LABORATORY JACK

SM-310

STAND, PIPETTE, hardwood, to hold twelve pipettes horizontally, six on either side.
Dozen **£11. 15. 0.** Each **£1. 1. 6.** c

SM-330

STAND, PIPETTE, comprises two polished wood disks mounted, by a vertical plated rod, on an iron tripod foot, to hold eighteen pipettes vertically.
Dozen **£43. 0. 0.** Each **£3. 18. 0.** c

SM-310

SM-330

PIPETTE RACKS, wall fixing see FV-241 and FV-243 in List No. sequence.

LABJACK

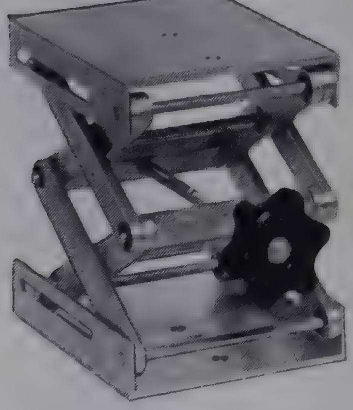
The Labjack has applications in almost every laboratory for raising and lowering equipment with smooth, precise control.

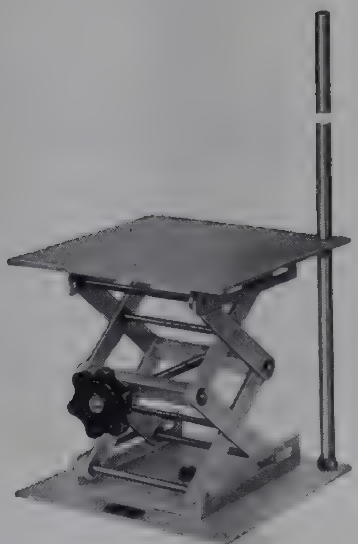
It is particularly convenient for:

- operations which require the very careful raising or lowering of water baths, oil baths, heating mantles and similar equipment.
- supporting Dewar flasks containing refrigerants used with cooling traps in vacuum systems.
- supporting flasks which must be readily removable, for instance in assemblies of interchangeable joint glassware.

The Labjack is very robustly constructed of heavy section aluminium alloy with anodised finish and is rigid in all positions of use without the necessity for clamping screws. The lifting mechanism is operated by a deeply corrugated plastics knob. Minimum height is 7·5 cm and maximum 27 cm. Maximum loads of over 25 kg can be lifted in the upper part of the range but in the lower range must be limited to about 9 kg on account of the extreme leverage at small angles of opening.

The top plate is 12·5 × 15 cm and can be extended to 20 cm square by the accessory plates SM-352. These plates can be bolted to the Labjack and are drilled to accept either one or two, ½ in diameter, retort stand rods secured to the base plate and projecting through the top plate. Apparatus can be clamped to the rods whilst allowing the platform to be adjusted.


SM-350


SM-350 with SM-352 and SM-420

SM-350

LABJACK, as above specification... Each **£8. 5. 0.** *m*

ACCESSORIES

SM-352	**Plates,** aluminium, 20 cm square, for bolting to Labjack, drilled to accept retort stand rods, complete with securing nuts	Pair **£1. 17. 0.** *m*
SM-420	**Retort stand rods,** cadmium plated	For details and prices see entries in List No. sequence.
SM-422	**Retort stand rods,** stainless steel	
SM-424	**Retort stand rods,** duralumin ...	

SPECIAL PURPOSE STANDS AND CLAMPS

Westergren pipette stands
see MEDICAL SCIENCES

Multiple clamp for micro-Kjeldahl apparatus
see NITROGEN DETERMINATION

All items on this page normally available from stock.

RETORT STANDS

BASES

SM-400

RETORT STAND BASES, rectangular, cast iron finished in stoved grey enamel, with hole at the centre of one end, tapped ⅜ in BSW. **For suitable rods see SM-420, SM-422 or SM-424.**

Size	A	B	C	D	E	
Length	6	7	8½	10	11¾ in	
Width	4	4¾	5½	6¾	8 in	
Weight, approx.	2	3	3¾	5	7½ lb	
Recommended length of rod	18	21	24	30	36 in	
Dozen	**74/–**	**98/–**	**130/–**	**175/–**	**215/–**	c
Each	**7/4**	**9/–**	**11/9**	**16/–**	**19/6**	

SM-402

RETORT STAND BASES, rectangular, stoved white epoxide resin finished cast iron, otherwise as SM-400.

Size	A	B	C	D	E	
Dozen	**98/–**	**130/–**	**165/–**	**220/–**	**285/–**	c
Each	**9/–**	**11/9**	**15/–**	**20/–**	**26/–**	

SM-403

RETORT or BURETTE STAND BASE, double. Stoved white epoxide resin finished, rectangular castiron with central hole tapped ⅜ in BSW. **For suitable rods see SM-420, SM-422 or SM-424.**

Dozen **£12. 15. 0.** Each **£1. 3. 6.** c

SM-405

RETORT STAND BASES, tripod shape stoved grey enamel cast iron, with rubber feet and hole tapped ⅜ in BSW. **For suitable rods see SM-420, SM-422 or SM-424.**

Size	A	C	E	
Spread of feet from centre	3½	5	7 in	
Weight	3	3½	7 lb	
Recommended length of rod	18	24	36 in	
Dozen	**130/–**	**190/–**	**320/–**	c
Each	**11/9**	**17/6**	**29/–**	

SM-406

RETORT STAND BASES, nesting tripod pattern. The dimension 'inset dia.' indicates the largest diameter of circular article which can be placed on the bench between the front feet. Particularly suitable for use with the *Gallenkamp* Handilab stirrer. **For suitable rods see SM-420, SM-422 or SM-424.**

Size	C	E	
Width	7	9 in	
Depth	8	10½ in	
Inset dia.	6	8½ in	
Weight	3¼	6½ lb	
Recommended length of rod	24	36 in	
Dozen	**140/–**	**235/–**	c
Each	**12/9**	**21/6**	

RODS

SM-420

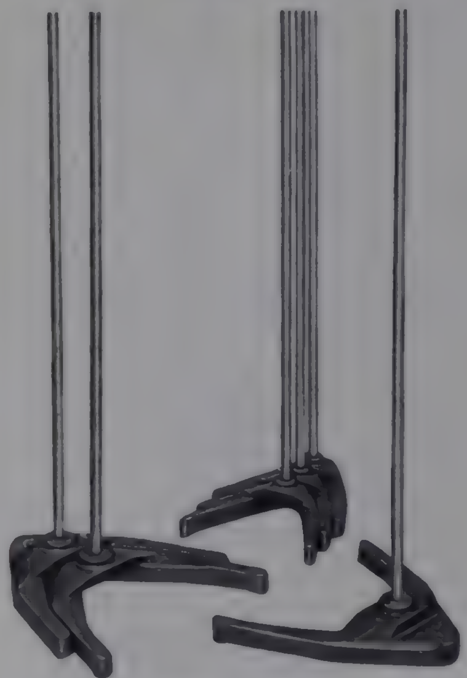
RETORT STAND RODS, cadmium plated mild steel with ⅜ in BSW thread at one end.

Size	A	B	C	D	E	
Length	18	21	24	30	36 in	
Dia.	⅜	⅜	½	½	½ in	
Dozen	**44/–**	**52/–**	**60/–**	**74/–**	**86/–**	c
Each	**5/–**	**5/8**	**6/4**	**7/4**	**8/3**	

SM-400 or SM-402 with rod

SM-403 with rod

SM-405 with rod


SM-406 with rod

SM-422

RETORT STAND RODS, bright finished stainless steel, otherwise as SM-420.

Size	A	B	C	D	E	
Length	18	21	24	30	36 in	
Dia.	⅜	⅜	½	½	½ in	
Dozen	**114/–**	**130/–**	**240/–**	**300/–**	**370/–**	c
Each	**10/3**	**11/9**	**22/–**	**27/–**	**34/–**	

SM-424

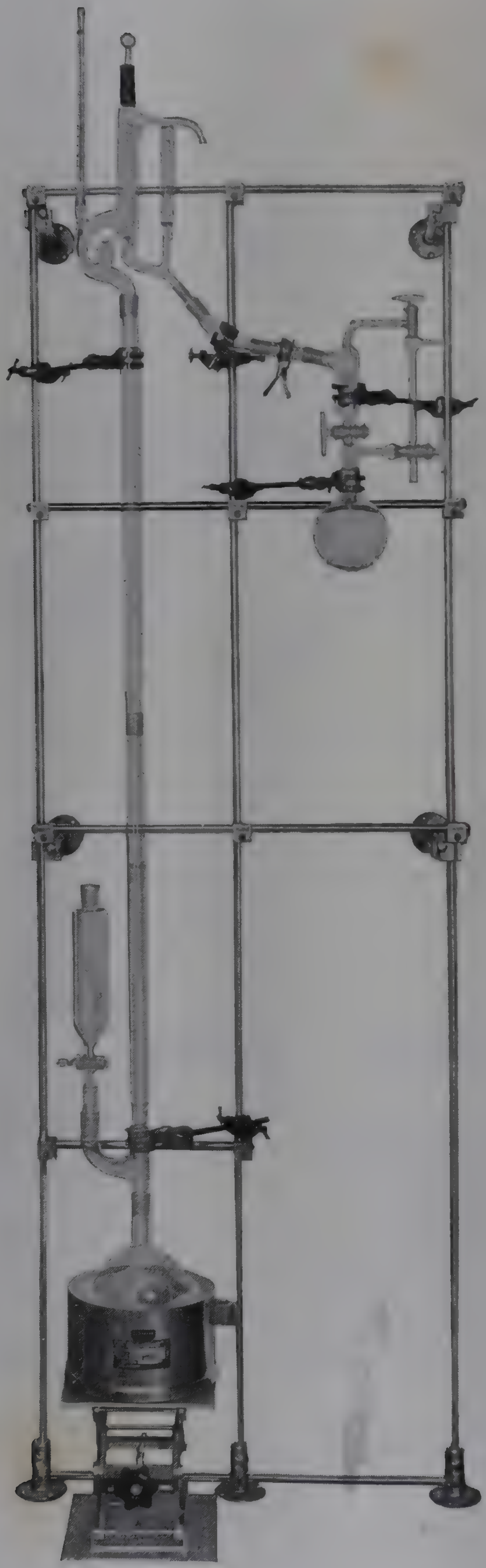
RETORT STAND RODS, bright finished duralumin light alloy, with ⅜ in BSW thread at one end.

Size	A	B	C	D	E	
Length	18	21	24	30	36 in	
Dia.	½	½	½	½	½ in	
Dozen	**59/–**	**68/–**	**76/–**	**90/–**	**106/–**	c
Each	**6/2**	**6/10**	**7/6**	**8/6**	**9/9**	

All items on this page normally available from stock.

Gallenkamp LABLOX SCAFFOLDING

For the bench, wall or floor mounting of glassware assemblies



Rigid—$\frac{1}{2}$ in diameter dural rods used with diecast connectors.

Simple—Assembled using a single size of standard hexagonal wrench.

Quick—Connectors easily fitted without being dismantled.

Permanent—Ideal for permanent laboratory and pilot plant assemblies.

Temporary—Equally suitable for temporary structures.

Adaptable—Accepts all standard retort rod bossheads, clamps and fittings.

Light alloy rods in a choice of 13 lengths are clamped at right angles in tangential contact by connectors SM-520, SM-522 or SM-524, it being a matter of individual preference which one is used in any particular situation. Connector SM-522, having a thumb screw can be operated by one hand without the use of tools.

Diagonal bracing rods, adding to the rigidity of larger structures, are neatly clamped with the adjustable angle adapter SM-528 (see Figs. 3, 4, 5) or alternatively by means of a short rod with two connectors on it at different angles (see Fig. 2).

Small frames can be constructed which are free standing (see Fig. 1) and can be moved at will. Larger frames may also be free standing, but are more usually fixed to bench, wall or floor or any combination of these. The three types of foot all have suitable fixing holes.

Apparatus may be supported on the Lablox frames by means of *Technico* clamps and bossheads together with any other of the normal retort stand fittings listed on pages 714 to 716. Such fittings should have their bossheads attached to vertical members of the Lablox frame to obtain the best support. For this reason the framework should be constructed with an adequate number of vertical rods, the horizontal rods being used only to secure adequate rigidity of the structure.

Gallenkamp LABLOX SCAFFOLDING ASSEMBLIES

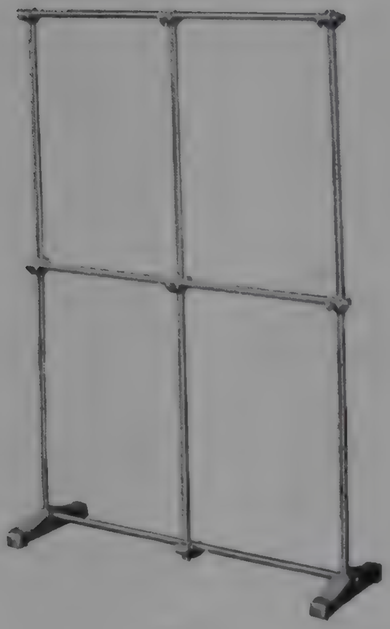


Fig. 1

Fig. 1

7 Connectors	SM-520
3 Rods 24 in	SM-540
3 Rods 36 in	SM-540
2 Feet	SM-555

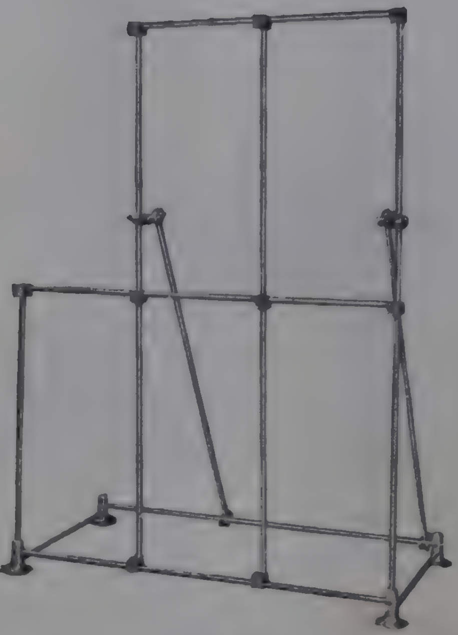


Fig. 2

Fig. 2

6 Connectors	SM-520
9 Connectors	SM-524
2 Rods 2½ in	SM-540
2 Rods 18 in	SM-540
2 Rods 24 in	SM-540
5 Rods 36 in	SM-540
3 Rods 48 in	SM-540
4 Feet	SM-550

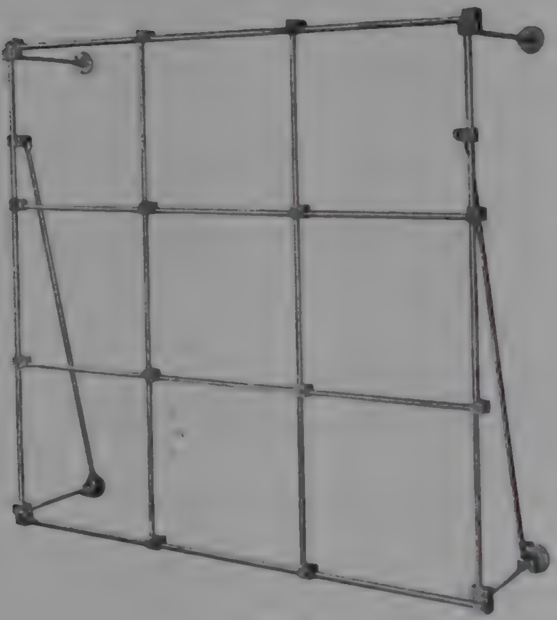


Fig. 3

Fig. 3

24 Connectors	SM-524
4 Adapters	SM-528
4 Rods 12 in	SM-540
2 Rods 36 in	SM-540
8 Rods 48 in	SM-540
4 Feet	SM-548

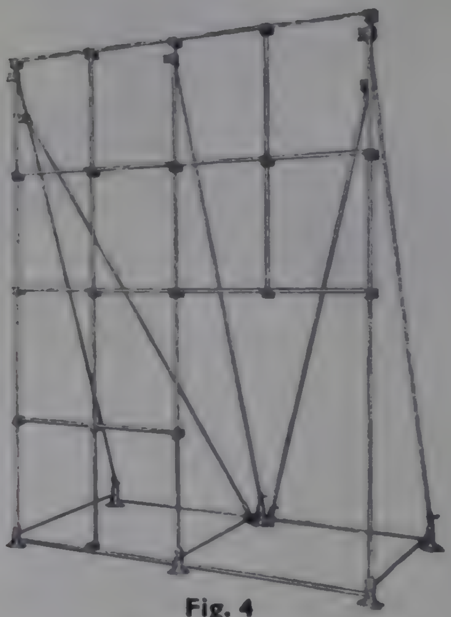


Fig. 4

Fig. 4

26 Connectors	SM-524
10 Adapters	SM-528
4 Rods 24 in	SM-540
1 Rod 30 in	SM-540
5 Rods 48 in	SM-540
9 Rods 60 in	SM-540
6 Feet	SM-550

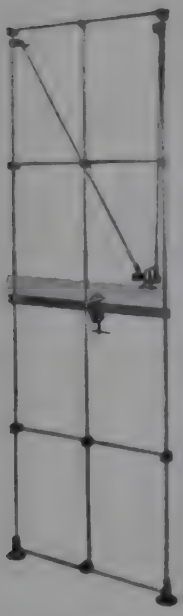


Fig. 5

Fig. 5

14 Connectors	SM-524
4 Adapters	SM-528
1 Clamp	SM-530
1 Rod 4 in	SM-540
4 Rods 24 in	SM-540
2 Rods 36 in	SM-540
3 Rods 72 in	SM-540
3 Feet	SM-550

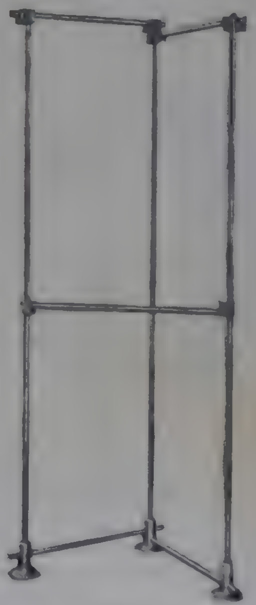
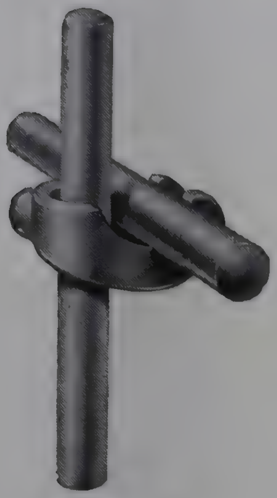


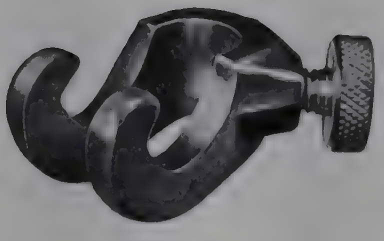
Fig. 6

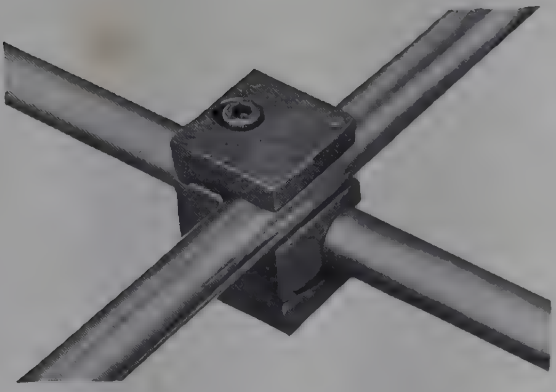
Fig. 6

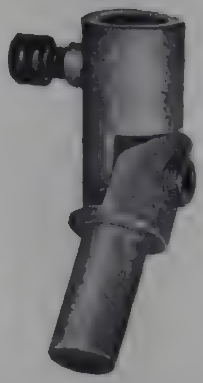
6 Connectors	SM-524
4 Rods 15 in	SM-540
1 Rod 18 in	SM-540
3 Rods 48 in	SM-540
3 Feet	SM-550

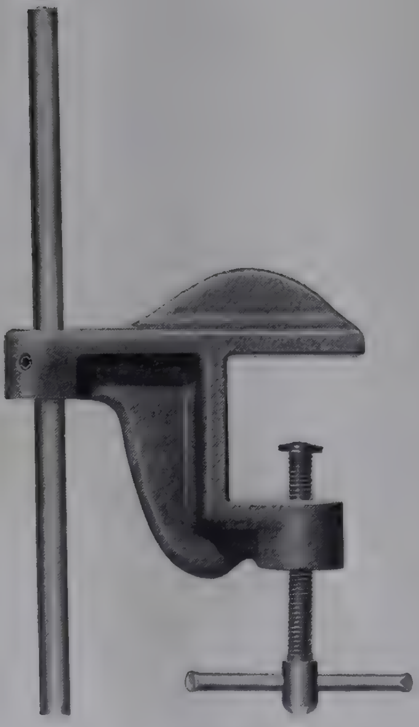
Gallenkamp LABLOX SCAFFOLDING COMPONENTS

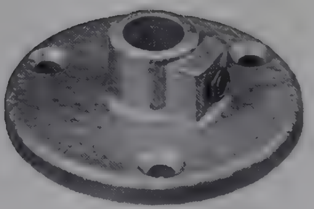

SM-520


SM-522


SM-524


SM-528


SM-530


SM-548

SM-520

CONNECTOR, Lablox, hook type, light alloy diecasting with a single socket headed clamping screw set at an angle to give maximum security of grip. It clamps two ½ in (12·5 mm) rods in tangential contact at right angles ... ... Dozen **£2. 6. 0.** Each **£0. 5. 2.** *b*

SM-522

CONNECTOR, Lablox, hook type, as SM-520 but with knurled head clamping screw for finger tightening. Dozen **£2. 6. 0.** Each **£0. 5. 2.** *b*

SM-524

CONNECTOR, Lablox, block type, a compact three piece alloy diecasting using two socket headed screws for clamping. The grip is between vee and flat faces which will hold rods from 5/16 to ½ in dia. (7·5 to 12·5 mm) at right angles in almost tangential contact. Dimensions 1½×1×1 in (40×25×25 mm). Dozen **£2. 6. 0.** Each **£0. 5. 2.** *b*

SM-528

ADAPTER, Lablox, adjustable angle, comprising two alloy diecastings connected together by a swivel joint. One end has a socket and set screw to accept ½ in dia. (12·5 mm) rods while the other has a dia. of ½ in (12·5 mm) to clamp into a Lablox block connector. This adapter is particularly useful for supporting diagonal bracing rods. Dozen **£2. 6. 0.** Each **£0. 5. 2.** *b*

SM-530

CLAMP, Lablox, bench mounting, a strong G clamp for fixing to edge of bench, with a boss and set screw to hold a ½ in (12·5 mm) rod vertically so that it can project below bench level. Dozen **£14. 15. 0.** Each **£1. 7. 0.** c

SM-540

RODS, Lablox, duralumin, ½ in (12·5 mm) dia.

Length	2·5	4	8	12	15	18	24	in
	6	10	20	30	37	45	60	cm
Dozen	**15/6**	**17/6**	**26/–**	**33/–**	**44/–**	**49/–**	**56/–**	*b*
Each	**2/11**	**3/1**	**3/8**	**4/3**	**5/–**	**5/6**	**6/–**	

Length	30	36	48	60	72	84	in
	75	90	120	150	180	210	cm
Dozen	**68/–**	**88/–**	**110/–**	**125/–**	**150/–**	**180/–**	*b*
Each	**6/10**	**8/3**	**10/–**	**11/3**	**13/6**	**16/6**	

SM-548

FOOT, Lablox, small circular, alloy diecasting 2½ in (63 mm) dia. ¾ in (20 mm) high, with three fixing holes to take wood screws SM-562, and a hole with socket headed set screw to support a ½ in (12·5 mm) rod in a vertical position on the bench or floor. It is also used for wall fixing to support a horizontal steadying rod. Dozen **£2. 2. 0.** Each **£0. 4. 11.** *b*

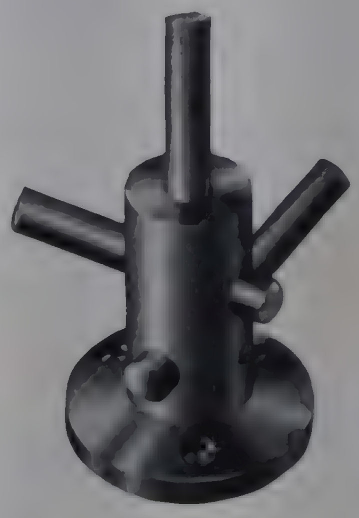
All items on this page normally available from stock.

Gallenkamp LABLOX SCAFFOLDING COMPONENTS

SM-550

FOOT, Lablox, large circular, light alloy diecasting 2⅝ in (67 mm) dia. 2¾ in (70 mm) high, with three fixing holes to take wood screws SM-562, and three holes with socket headed set screws to support three ½ in (12·5 mm) rods, one vertically and two horizontally at right angles Can be used to construct a rigidly framed base for a free standing framework.

Dozen **£5. 4. 0.** Each **£0. 9. 6.** *b*



SM-550

SM-555

FOOT, Lablox, bar pattern, of stove enamelled cast iron, 8 in (205 mm) long, weight 2½ lb (1·1 kg) with two holes with socket headed set screws to support two ½ in (12·5 mm) rods, one vertically and one horizontally. A pair of these feet can be used for a free standing small framework, but fixing holes for wood screws SM-562 are provided for use when greater stability is required.

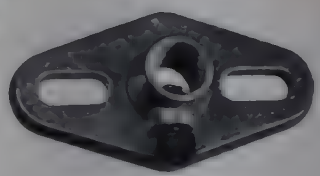
Dozen **£10. 0. 0.** Each **£0.18. 0.** *b*

SM-557

SLOTTED BRACKET, Lablox, alloy diecasting with hole and socket headed set screw to support one ½ in (12·5 mm) rod, and two slotted holes for bolting to *Dexion* or other types of slotted angle frames.

Dozen **£1.18. 0.** Each **£0. 4. 7.** *b*

SM-555



SM-557

ACCESSORIES

SM-560 **Wrench,** with plastics handle, for socket headed screws $\frac{5}{32}$ in across flats, as fitted to all above components of Lablox support frames.
Dozen **£2. 5. 0.** Each **£0. 5. 2.** *m*

SM-562 **Wood screws,** plated finish, length 1¼ in for securing feet SM-548, SM-550 and SM-555 to bench, wall or floor.
Gross **£1.14. 0.** Dozen **£0. 4. 4.** c

SETS OF LABLOX COMPONENTS

SM-594

LABLOX INTRODUCTORY SET, comprising components as listed below from which a considerable variety of simple structures can be built.

SM-520	12 Hook connectors
SM-524	18 Block connectors
SM-540	4 each Rods 2½, 12, 18 and 48 in
SM-540	6 each Rods 24 and 36 in
SM-550	4 Large circular feet
SM-560	1 Wrench for setscrews
SM-562	12 Fixing screws

Set **£14.17. 6.** *b*

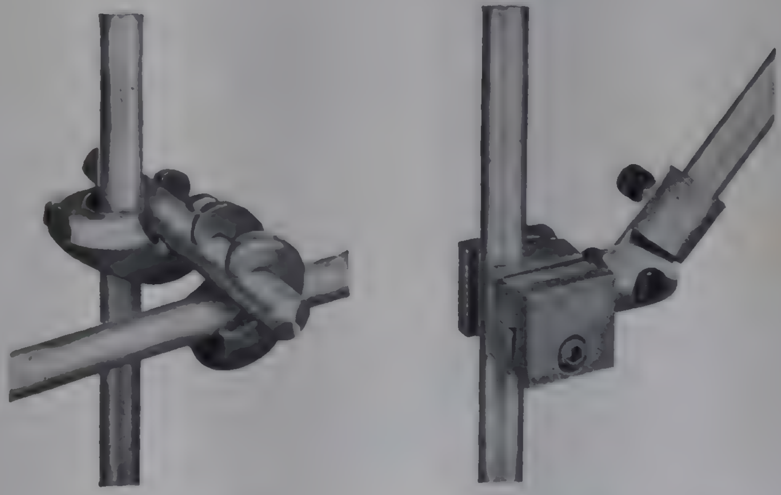
SM-595

LABLOX SUPPLEMENTARY SET, for extending the use of SM-594, comprising components as follows:

SM-520	12 Hook connectors
SM-524	12 Block connectors
SM-528	4 Adjustable angle adapters
SM-540	2 each Rods 2½, 18 and 48 in
SM-540	4 Rods, 4 in
SM-540	6 Rods, 8 in
SM-548	4 Small circular feet
SM-555	2 Bar pattern feet
SM-560	1 Wrench for setscrews
SM-562	12 Fixing screws

Set **£10.15. 0.** *b*

Examples of diagonal bracing



Using connectors SM-520 with rod

Using adjustable angle adapter SM-528

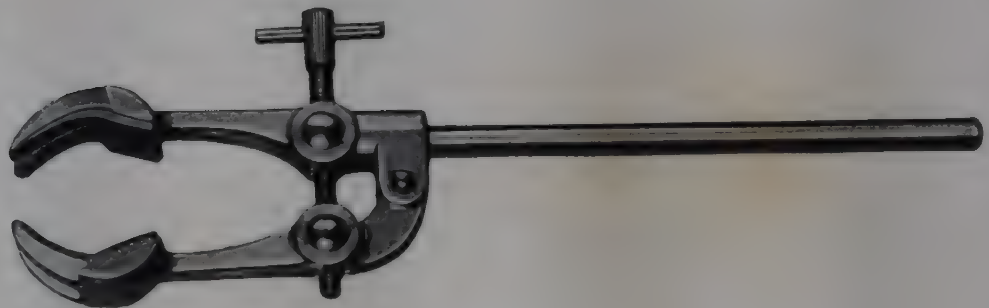
All items on this page normally available from stock.

Technico UNIVERSAL CLAMP AND BOSSHEAD

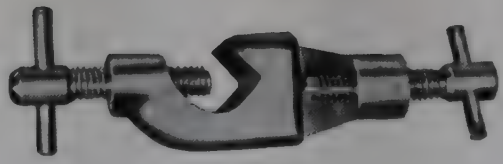
REGD. TRADE MARK

- **Diecastings are corrosion resistant throughout, not merely surface protected**
- **No iron parts to rust**
- **Well secured cork liners**
- **Bosshead takes rods up to 16 mm dia. in each jaw**
- **Mass production methods provide lowest possible price with consistent high quality**

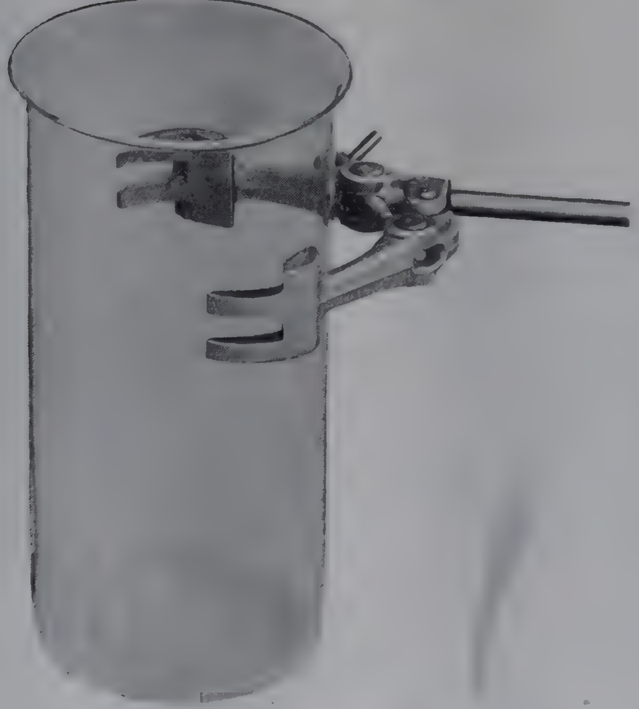
SM-600 extended 6 mm



SM-600



SM-610



SM-600 extended 90 mm

SM-600

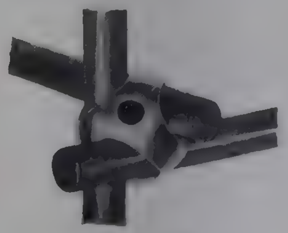
CLAMP, RETORT STAND, *Technico*, universal, enables articles between 2 mm and 90 mm diameter to be securely clamped. Construction of light alloy pressure diecastings with other parts of nickel plated brass, both materials giving a good degree of corrosion resistance. The design of the jaw ensures a firm grip at all angles of opening. The cork liners are secured by an epoxy resin adhesive which is unaffected by steam, acids or ordinary reagents. The $\frac{5}{16}$ in (8 mm) diameter rod is suitable for use in bossheads SM-610, SM-635 and SM-637.

Gross **£59. 0. 0.** Dozen **£5. 6. 0.** *b*

SM-610

BOSSHEAD, *Technico*, Regd. Design No. 860962, with offset jaws for greatly increased strength. Comprises a light alloy pressure diecasting with clamping screws of nickel plated brass, both materials giving a good degree of corrosion resistance. The vee-grooves in the body are absolutely true and give a perfect grip in either jaw on rods up to 16 mm diameter ... Gross **£31. 0. 0.** Dozen **£2. 16. 0.** *b*

All items on this page normally available from stock.


SM-625

SM-630

***SM-625**

CONNECTOR, *Triclamp.* A small, compact connector to clamp two or three 13 mm (or nominal $\frac{1}{2}$ in rods) in tangential contact, mutually at right angles on laboratory scaffold assemblies. Diecast in a strong, light alloy, the two halves of the clamp are bolted together by means of a single 3 mm socket headed bolt and nut.
12 packs **£40. 0. 0.** *m*
Pack of 12 **£3. 12. 0.**

BOSSHEADS

SM-630

BOSSHEAD, aluminium alloy, to take rod from $\frac{1}{2}$ in (12·5 mm) to $\frac{3}{4}$ in (19 mm) in both jaws.
Dozen **£4. 16. 0.** Each **£0. 9. 0.** c

SM-635

SM-637

SM-635

BOSSHEAD, aluminium alloy diecasting, to take range of clamps and support plates SM-600 and SM-668 to SM-695 and rings SM-710 and SM-720. The jaw accepts rod up to $\frac{5}{8}$ in (16 mm) diameter and the bosshead is drilled to take $\frac{5}{16}$ in (8 mm) diameter rod, secured by a single socket headed cap screw at right angles to the support rod.
Dozen **£2. 8. 0.** Each **£0. 5. 4.** c

ACCESSORY

SM-560 **Wrench,** for socket headed cap screws. For price see entry in List No. sequence.

SM-637

BOSSHEAD, quick release, with stainless steel leaf spring clamp which grips a $\frac{1}{2}$ in (12·5 mm) dia. support rod. When the spring clamp is held under finger pressure its grip is released and the position of the bosshead on the support rod may easily be altered. The bosshead accepts SM-600, SM-668 to SM-695, SM-710, SM-720 and any $\frac{5}{16}$ in (8 mm) dia. rod at right angles to the support rod, secured by a single socket-head grub screw.
Dozen **£12. 5. 0.** Each **£1. 2. 6.** c

ACCESSORY

SM-560 **Wrench,** for socket-head grub screw. For price see entry in List No. sequence.

SM-640

CLAMPS

SM-640

CLAMP, for beakers up to 5 litres, cadmium plated malleable iron, with asbestos covered rod type jaws, opening up to 17 cm max. The $\frac{3}{4}$ in horizontal support rod is offset so that large vessels are secured in line with the axis of the vertical support rod. Each **£1. 12. 0.** c

SM-645

SM-645

CLAMP, for *Quickfit* **reaction vessels** having wide necks and flat flange joints. The cadmium plated malleable iron clamp has asbestos fabric covered jaws and is supplied with two interchangeable offset support rods. One rod is used with vessels up to 5 litres and the other with 10 and 20 litre reaction vessels. The $\frac{3}{4}$ in dia. rods are secured by socket headed cap screws for which a wrench is provided ... ... Each **£1. 12. 0.** c

SM-668

SM-668

CLAMP, SEMI-MICRO, stainless steel, with three-pronged rubber sleeved jaws, and $\frac{1}{4}$ in (6·3 mm) diameter rod for mounting in bossheads SM-635 and SM-637. The sliding hinge permits the clamp to grip apparatus up to 40 mm diameter.
Dozen **£17. 10. 0.** Each **£1. 12. 0.** c

For spring pattern Semi-Micro Clamp see SM-685 in List No. sequence.

All items on this page normally available from stock.

CLAMPS

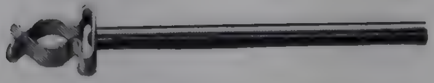
(continued)

SM-670

SM-670

CLAMPS, SPRING, for supporting condensers etc., with $4\frac{1}{2}$ in (11·5 cm) long rod, $\frac{5}{16}$ in (8 mm) diameter, to fit bossheads SM-610, SM-635 and SM-637.

Clamp diameter	20	35	40 mm	
Dozen	**55/–**	**62/–**	**62/–**	c
Each	**5/10**	**6/4**	**6/4**	

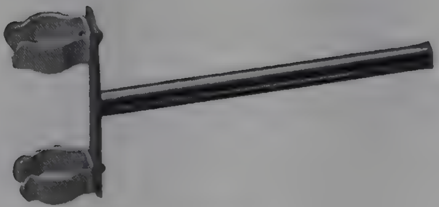


SM-680

SM-680

CLAMPS, SPRING, for supporting semi-micro apparatus and glass tubing. Comprises polythene coated spring clip attached to $4\frac{1}{2}$ in (11·5 cm) long rod, $\frac{5}{16}$ in (8 mm) diameter, to fit bossheads SM-610, SM-635 and SM-637.

Clip size	7	13	20 mm	
Dozen	**29/6**	**32/–**	**34/–**	c
Each	**4/1**	**4/2**	**4/4**	

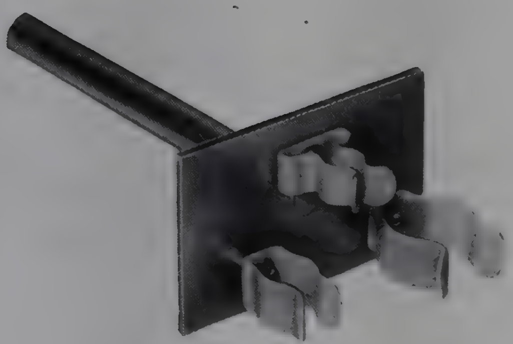


SM-682

SM-682

CLAMP, SPRING, for supporting burettes. Comprises two polythene coated spring clips 5 cm apart on a plate attached to a 15 cm long rod, 8 mm diameter, to fit bossheads SM-610, SM-635 and SM-637.

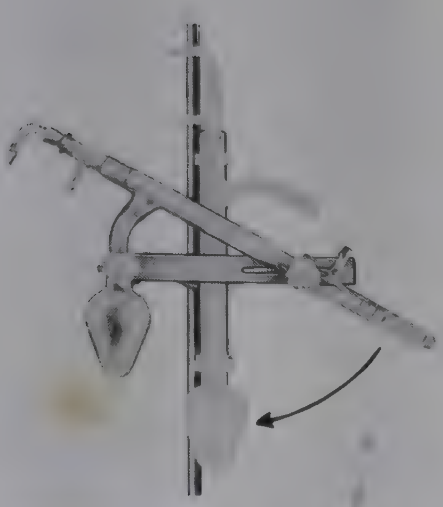
Clip size For burettes	6 1 and 2	10 5 and 10	13 mm 50 cm³	
Dozen	**68/–**	**70/–**	**72/–**	c
Each	**6/10**	**7/–**	**7/2**	



SM-683

SM-683

CLAMP, SPRING, for supporting two electrodes and a thermometer or other groups of similar glass apparatus of small diameters. Comprises one each polythene coated spring clips, 6, 10 and 13 mm diameter mounted 15 mm apart on a metal plate attached to a rod 15 cm long, $\frac{5}{16}$ in (8 mm) dia., to fit bossheads SM-610, SM-635 and SM-637 ... Dozen **£5. 0. 0.** Each **£0. 9. 3.** c



SM-685 in use illustrating how a reflux assembly can be rotated and quickly re-arranged for distillation

SM-685

CLAMP, SEMI-MICRO, designed by J. C. Spiring, Patent No. 1070015. A simple but versatile clamp for supporting assemblies made from small scale preparative set DT-750 and similar apparatus. Comprises a slotted bar 17 cm long with $\frac{5}{16}$ in (8 mm) dia. rod for mounting in bossheads SM-610, SM-635 and SM-637. The assemblies are held in two spring clips; both clips can be rotated and one can slide to vary the distance between them from 8·5 to 15 cm. The clamp can be held vertical or horizontal or at any oblique angle. Supports a variety of glass assemblies easily and securely with consequent saving of time and reduction in breakages.

Dozen **£9. 0. 0.** Each **£0. 16. 6.** c

All items on this page normally available from stock.

PLATES

SM-695

SUPPORT PLATE, diameter 3 in (7·5 cm), with 4½ in (11·5 cm) long rod, $\frac{5}{16}$ in (8 mm) diameter, to fit bossheads SM-610, SM-635 and SM-637.

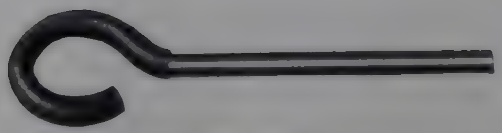
Dozen **£2. 8. 0.** Each **£0. 5. 4.** c

SM-695

SM-705

SUPPORT PLATE, diameter 4 in (10 cm), with 5 in (12·5 cm) long rod, $\frac{7}{16}$ in (11 mm) diameter, to fit bossheads SM-610 and SM-630.

Dozen **£4.16. 0.** Each **£0. 9. 0.** c



SM-710

RINGS

SM-710

SUPPORT RING, open, vinyl coated, internal diameter 1 in (25 mm), with 4½ in (11·5 cm) long rod, $\frac{5}{16}$ in (8 mm) diameter, to fit bossheads SM-610, SM-635 and SM-637.

Dozen **£2. 8. 0.** Each **£0. 5. 4.** c

SM-720

SM-720

RINGS, retort stand, of dull plated mild steel 8 mm rod with welded joint and plain stem. The sizes are chosen from the R10 series of preferred numbers in BS 2045 so that each step represents an increase in diameter of approx. 25%. To fit bossheads SM-610, SM-635 and SM-637.

Internal dia.	5	6·3	8	10	12·5	16 cm	
Stem length	14	13	12·5	11·5	10	9 cm	
Dozen	**42/–**	**45/–**	**50/–**	**52/–**	**62/–**	**70/–**	c
Each	**4/11**	**5/2**	**5/6**	**5/8**	**6/4**	**7/–**	

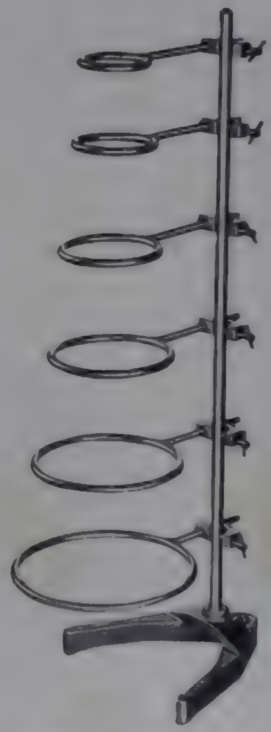
SM-725

RINGS, retort stand, as above, fitted with bosshead SM-635. This provides a ring complete with bosshead at a cost no greater than the conventional fixed pattern but with the advantages of adjustability, better quality finish and the fact that the bosshead will accept rods up to 16 mm dia.

Internal dia.	5	6·3	8	10	12·5	16 cm	
Dozen	**90/–**	**93/–**	**98/–**	**100/–**	**110/–**	**118/–**	c
Each	**8/6**	**8/9**	**9/–**	**9/3**	**10/–**	**10/9**	

ACCESSORY

SM-560 **Wrench,** for socket headed cap screws. For price see entry in List No. sequence.



SM-725 (SM-720 and SM-635) on stand

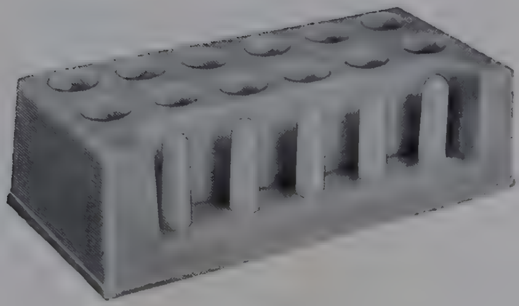
All items on this page normally available from stock.

TEST TUBE STANDS

SM-824

STANDS, TEST TUBE, hardwood of good quality finish, with or without draining pegs.

List No.	No. of holes 20 mm dia.	No. of holes 32 mm dia.	No. of pegs	Dozen	Each	
SM-822	10	2	—	**88/–**	**8/3**	c
SM-824	5	1	6	**80/–**	**7/10**	c
SM-826	10	2	12	**125/–**	**11/3**	c
SM-828	—	6	—	**74/–**	**7/4**	c



SM-872

***SM-872**

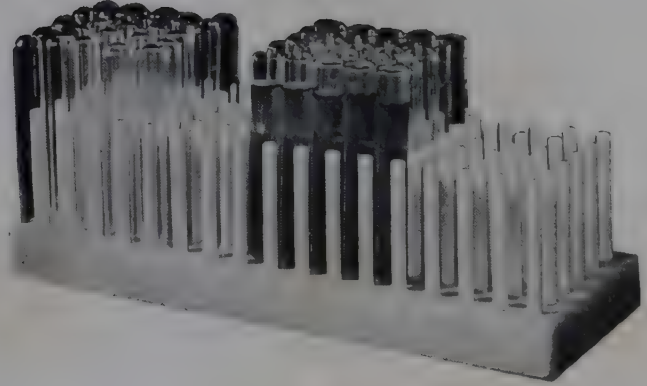
STAND, TEST TUBE, rigid polythene, with twelve 20 mm ($\frac{3}{4}$ in) diameter holes in two rows, and five 11 mm ($\frac{7}{16}$ in) diameter draining pegs ... Each **£0. 17. 0.** *m*

***SM-874**

STAND, TEST TUBE, rigid polythene, with twelve $1\frac{1}{4}$ in (32 mm) diameter holes in two rows with cut aways on four for observation purposes ... Each **£1. 0. 0.** *m*

ACCESSORY

SM-875 **Inserts for above stand to reduce holes to 1 in (25 mm) dia. ... Dozen sets £2. 16. 0. Set of 12 £0. 6. 0.** *m*



SM-876

***SM-876**

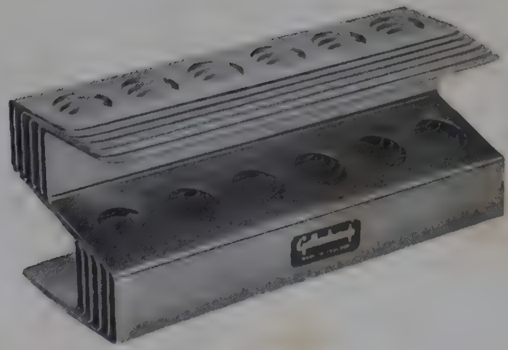
STAND, TEST TUBE, rigid polythene, to hold 80 test tubes 10 to 13 mm dia. when filled or 102 test tubes inverted over the pegs for draining.
Dozen **£11. 2. 6.** Each **£1. 0. 6.** *m*

SM-880

STAND, TEST TUBE, stainless steel. A new design which can be nested for economical storage. Tough and resilient construction from one piece of stainless steel. With 6 holes 20 mm diameter in one row.
Dozen **£11. 5. 0.** Each **£1. 0. 6.** c

SM-885

STAND, TEST TUBE, stainless steel. Nesting pattern as SM-880 but with 12 holes 20 mm diameter in two rows ... ... Dozen **£17. 0. 0.** Each **£1. 11. 0.** c



6 × SM-880
nested for storage

Stands for certain sizes of tubes will also be found in List No. sequence as follows:

CX-480	Rack for 48 culture tubes, 16 mm dia.
ME-480	Rack for 30 Kahn or culture tubes, 12 mm dia.
WF-386 to **WF-394**	Range of water bath racks to hold 12·5 to 25 mm dia. tubes.

All items on this page normally available from stock.

TRIPOD STANDS

SM-910

STANDS, TRIPOD, cast iron, with triangular top and splayed steel legs. Overall height 20 cm.

Length of side	12·5	15 cm	
Dozen	52/–	66/–	c
Each	5/8	6/8	

SM-910

SM-915

SM-915

STANDS, TRIPOD, cast iron, with circular top and splayed steel legs.

Overall height	20	25 cm	
Top diameter	12·5	20 cm	
Dozen	68/–	102/–	c
Each	6/10	9/6	

For suitable **Gauzes** see GK-100 and GK-105 in List No. sequence.

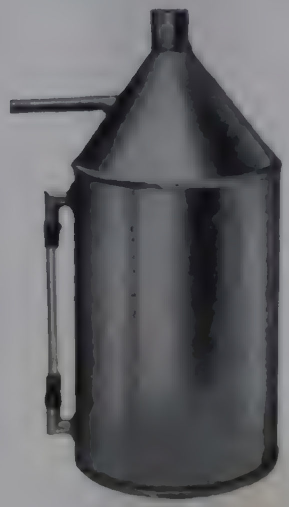
For suitable **Wire Triangles** see TV-540 to TV-570 in List No. sequence.

STEAM GENERATORS

SP-430

STEAM GENERATOR, copper, with all joints brazed. With outlet tube and glass gauge tube. Capacity 4 litres.

Each £7. 15. 0. c



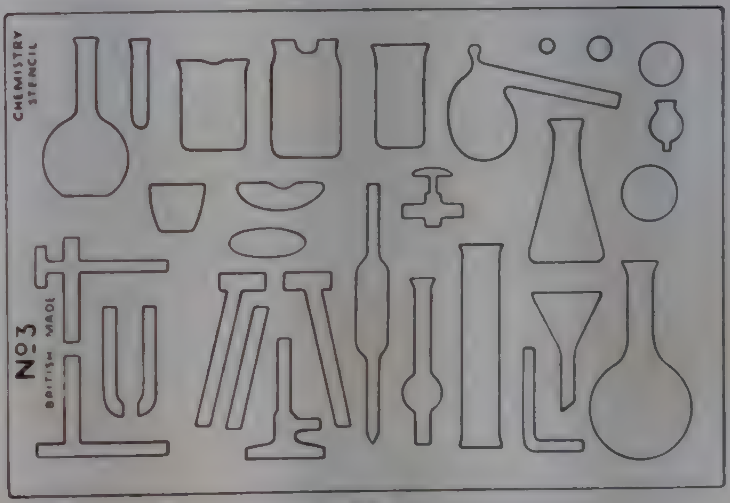
SP-430

STENCILS

SP-930

STENCIL, chemical apparatus, transparent celluloid 15 × 10 cm, with 30 separate outlines.

Dozen £0. 14. 6. Each £0. 2. 10. c



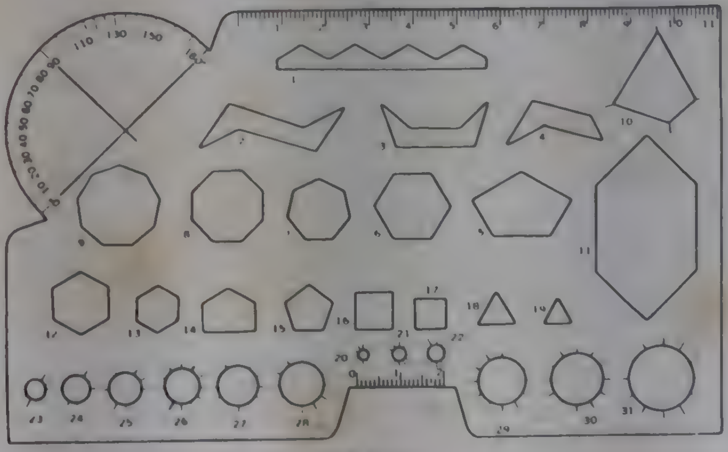
SP-930

***SP-960**

STENCIL, organic and structural chemical, for the clear and rapid drawing of all common notations for cyclic and polynuclear compounds. The size and spacing of cut-outs are consistent with standard typewriter spacing. Facilities are provided for three-dimensional representation of molecules which exhibit stereochemical and isomeric properties, also for molecular orbital and valence bonded models.

A protractor and a millimetre scale are provided for use with the cut-outs to establish the spatial arrangement of atoms within the molecule. Atoms are represented by a series of circular holes marked with radial lines to indicate common bond angles. Supplied complete with detailed instruction booklet. This stencil is recommended for use in conjunction with molecular model sets MV-800 to MV-870. Size approx. 16 × 10 cm.

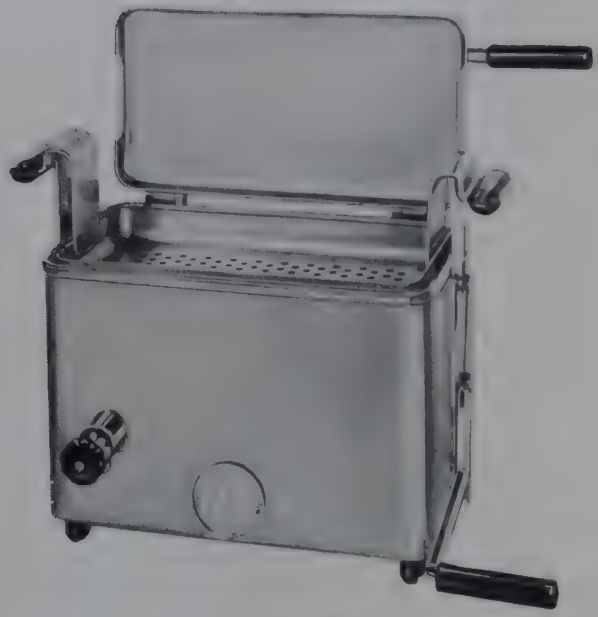
Dozen £6. 15. 0. Each £0. 12. 3. *m*



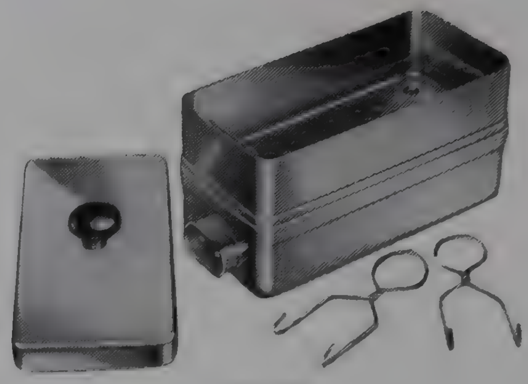
SP-960

All items on this page normally available from stock.

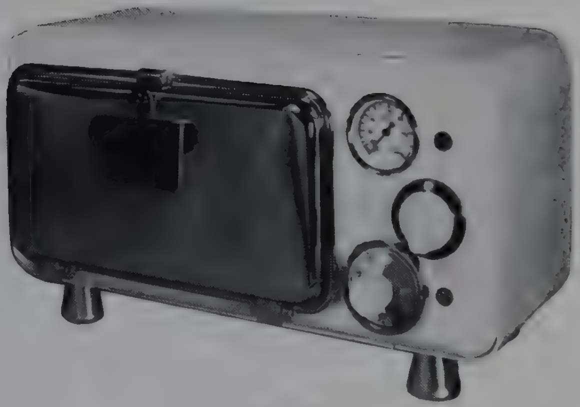
STEAM AND HOT AIR STERILIZERS



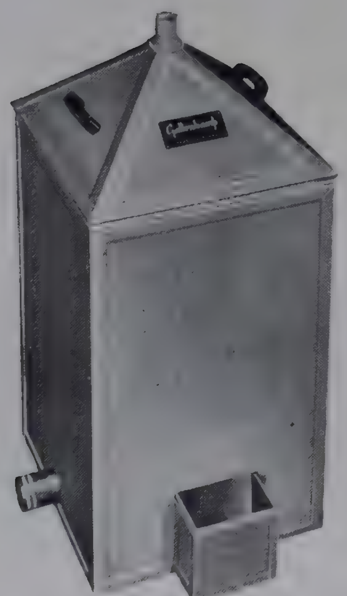
SR-632



SR-600



SR-652



SR-720

SR-600

STERILIZER, STEAM, electrically heated, for sterilizing small surgical instruments. Includes automatic safety cut-out to operate if the bath boils dry. With a removable perforated tray, tray lifters and cover. Overall dimensions 20×9×10 cm (8×3½×4 in). Heater rating 300W. For 230/250V a.c. supplies only.
Each **£10. 4. 6.** *m*

SR-632

STERILIZER, STEAM, automatic electric, for surgical and dental instruments. Fitted with 3-heat switch control and automatic safety cut-out to prevent damage in the event of boiling dry. Seamless chromium plated boiler with screw-down draw-off tap, hinged lid and robust, lever operated tray lifting mechanism. All handles are heat insulated. The lid closes into a drip channel to prevent water dripping down outside. Boiler dimensions 35×16×12·5 cm (14×6½×5 in). Heater rating 1200W. For 230/250V a.c. supplies only.
Each **£44. 14. 6.** *f*

SR-652

STERILIZER, HOT AIR, electrically heated with automatic thermostatic control in the range 100° to 200°C. For dry sterilization of small surgical instruments placed in 3 removable sliding trays. Two pilot lights indicate mains connection and thermostat operation. A control knob selects temperature of operation. A dial thermometer and a time switch 0—120 mins are fitted. All parts are finished in hard white stoved enamel or chromium plate. Inside dimensions 35×16×17 cm (14×6½×6¾ in). Heater rating 750W. For 230/250V a.c. supplies only ... ... Each **£40. 0. 0.** *m*

SR-720

STERILIZER, STEAM, Koch, square pattern, electrically heated. The internal surfaces and two removable perforated shelves are of tinned copper while the external surfaces and cover are constructed from copper and hardboard finished in grey duotone stoved enamel. Heated by double loop tubular immersion heater with connector which is ejected automatically if the chamber boils dry. With filling trough and mounted on four rubber feet. The cover is fitted with lifting handles and a thermometer tubulure. Overall dimensions 71×36×38 cm (28×14×15 in). Heater rating 1500W. For 220/240V a.c. supplies ... ... Each **£45. 0. 0.** *m*

When ordering STERILIZERS please state voltage and nature of supply.

All items on this page normally available from stock.

OV-010 HOTBOX OVEN/STERILIZER

A robust, high performance, economically priced oven with large shelf area and especially wide to accommodate pipette sterilizing boxes.

Gallenkamp OVENS

FOR HOT AIR STERILIZING

The following *Gallenkamp* laboratory ovens are frequently used as hot air sterilizers. Full specifications and details may be found under OVENS.

OV-010	'Hotbox' Oven/Sterilizers.
OV-060	Economy Oven.
OV-160 **OV-330**	BS Ovens.
OV-420	Large capacity Oven/Sterilizer.

See also *Gallenkamp* electric, gas and steam **AUTOCLAVES.**

STERILIZING ACCESSORIES

FOR STEAM STERILIZING AT TEMPERATURES UP TO 120°C

SR-760

STERILIZING BASKETS, steel wire nylon coated, for test tubes.

Dimensions	10×10×10	12·5×12·5×12·5	cm	
	4×4×4	5×5×5	in	
Each	14/6	17/6		b
Dimensions	15×15×15	20×20×20	cm	
	6×6×6	8×8×8	in	
Each	21/-	27/-		b

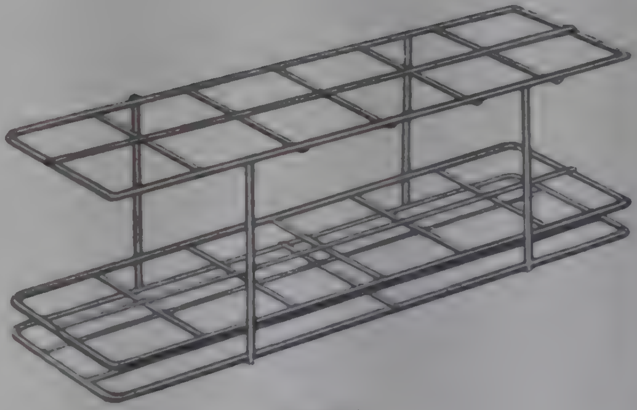
SR-760

SR-772

STERILIZING RACK, steel wire nylon coated, to hold twelve McCartney bottles CX-210 or CX-215 or universal containers CX-220.
Dozen **£7. 0. 0.** Each **£0. 12. 9.** c

SR-780

STERILIZING CONTAINER, polypropylene. A highly finished, oval cross section container with perforated lid, suitable for small articles such as forceps and scissors up to 19 cm in length. Internal cross section 63×34 mm ... Dozen **4. 0. 0.** Each **£0. 7. 10.** c



SR-772

SR-780

FOR STEAM AND HOT AIR STERILIZING AT HIGHER TEMPERATURES

SR-800

STERILIZING BOXES, stainless steel, for pipettes, with close fitting lid.

Length	38	45 cm
Diameter	6·5	6·5 cm
Each	**£2. 4. 0.**	**£2. 9. 0.** c

SR-820

STERILIZING BOXES, stainless steel, for 10 cm diameter Petri dishes, with lifting rack. Length 26 cm, diameter 12 cm ... ... Each **£4. 8. 0.** c

SR-800

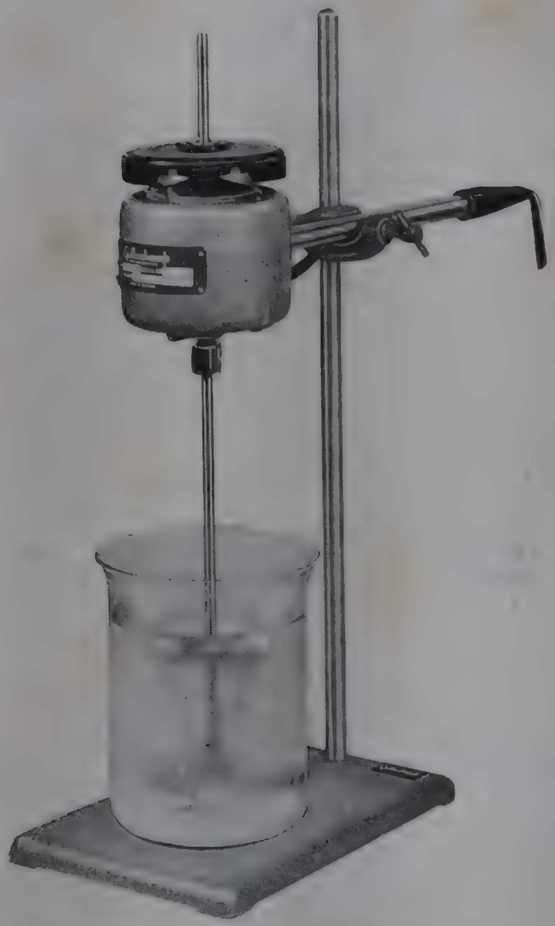
SR-820

Dishes—see DM-240 et seq. in List No. sequence.
'Sterile' labels—see LB-150 in List No. sequence.
Trays—see TU-515 et seq. in List No. sequence.

All items on this page normally available from stock.

Gallenkamp HANDILAB STIRRER

THE VERSATILE STIRRER WITH PUSH-FIT ACCESSORIES



SS-425 with rotor, beaker and stand

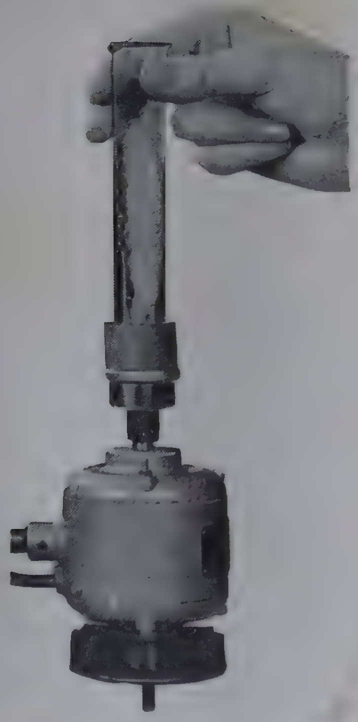
SPEED OF ROTATION 1200 rev/min approximately

QUIET FAN COOLED INDUCTION MOTOR WITH HOLLOW SHAFT WHICH FACILITATES:

- Rapid push-in fitting of accessories
- Accurate adjustment of stirrer height or immersion depth
- Quick raising of stirrer for removal of beaker or container
- Fitting accessories from either end of the shaft
- Clockwise or counterclockwise rotation

ACCESSORIES INCLUDE:

- Stirrer paddles in polythene or stainless steel
- Orbital mixer for speedy mixing of test tube contents
- Magnetic head for remote stirring in closed vessels
- Chuck for 6·35 mm (¼ in) diameter fittings
- Pulley for belt driving stirrers, etc.
- Stirrer with low friction vacuum tight gland in standard interchangeable joint
- Speed control rheostat



SS-425 with orbital mixer SS-450 stirring contents of a test tube

SS-425

STIRRER, Handilab, *Gallenkamp*, as specification with motor of 1 kgf cm torque. With length of 3-core flexible cable. **Without accessories.**

For 220/240V 50 Hz single phase supplies.
Each **£7. 5. 0.** *b*
For 200/210V 50 Hz single phase supplies.
Each **£7. 10. 0.** *b*
For 110/120V 60 Hz single phase supplies.
Each **£7. 10. 0.** *b*

When ordering please state voltage and nature of supply.

All items on this page normally available from stock.

Gallenkamp HANDILAB STIRRER

SS-426
STIRRER KIT, Handilab, *Gallenkamp*, comprising hollow shaft stirrer SS-425, stainless steel rotor SS-430, polythene rotor SS-440, magnetic stirring rotor SS-444, set of magnetised followers SS-626, pulley SS-460, chuck SS-455 and glass stirrer SS-550, in box.
For 220/240V 50 Hz single phase supplies.
Each **£15. 0. 0.** *b*
For 200/210V 50 Hz single phase supplies.
Each **£15. 5. 0.** *b*
For 110/120V 60 Hz single phase supplies.
Each **£15. 5. 0.** *b*

When ordering please state voltage and nature of supply.

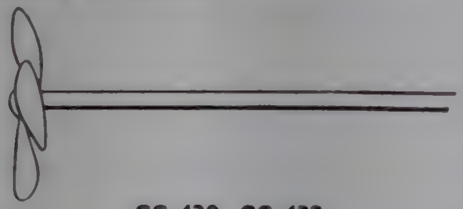
Suitable lubricant for motor bearings see LX-110 in List No. sequence.

ACCESSORIES

SS-427
RHEOSTAT, rotary, fully enclosed, for bench or wall mounting, giving smooth speed control of stirrer SS-425. With length of 3-core cable, plug and socket connector.
Each **£7. 0. 0.** *b*

When ordering please state voltage of motor for which rheostat is required.

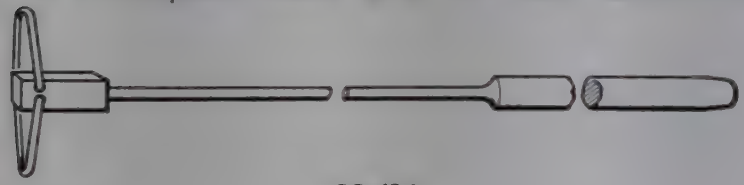
ROTORS TO FIT HOLLOW SHAFT OF HANDILAB STIRRER



SS-430, SS-432

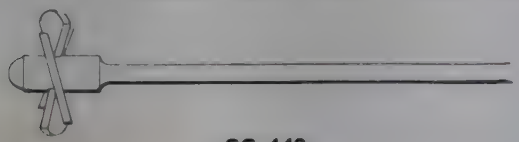
SS-430
ROTOR, stainless steel, with 38 cm shaft and 4-bladed 4·5 cm impeller. Dozen **£8. 5. 0.** Each **£0.15. 0.** *b*

SS-432
ROTOR, stainless steel, with 38 cm shaft and 4-bladed 5·7 cm impeller. Dozen **£8. 10. 0.** Each **£0.15. 6.** *b*



SS-434

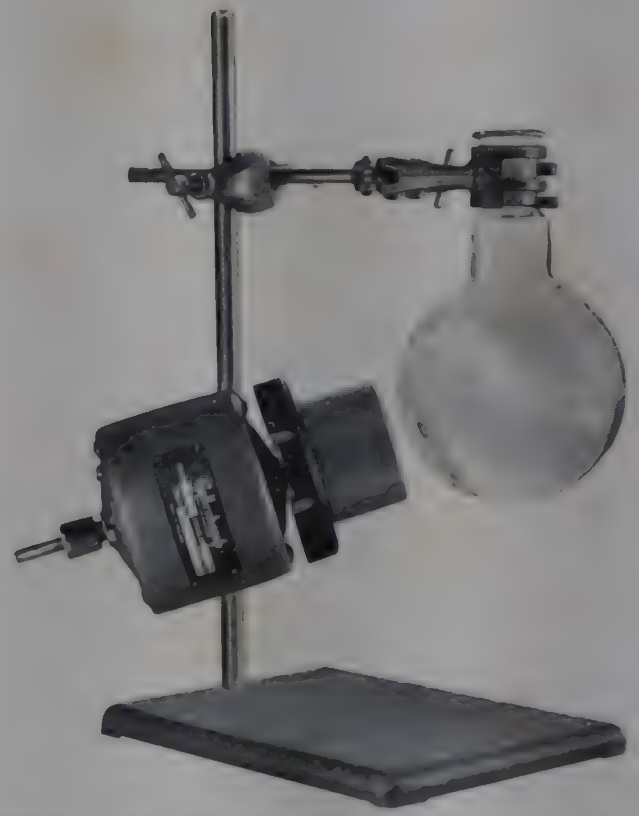
SS-434
ROTOR, stainless steel, total length 38 cm with 18 cm rod which fits the hollow shaft of the stirrer, joined by a thin shaft to a heavy rotor bob which carries a chain link stirrer. The flexible shaft provides exceptionally vibrationless operation.
Dozen **£23. 0. 0.** Each **£2. 2. 0.** *b*



SS-440

SS-440
ROTOR, polythene, with 38 cm steel reinforced shaft and 4-bladed 4·5 cm impeller.
Dozen **£4. 0. 0.** Each **£0. 7.10.** *c*

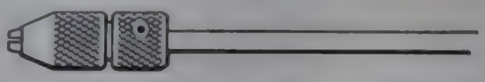
Pully driven ROTOR, for 24/29 standard socket, see SS-570 in List No. sequence.



SS-425 with magnetic rotor SS-444 and follower, stirring the contents of a flask

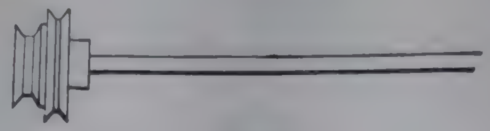
SS-444
ROTOR, magnetic, with 18 cm stainless steel shaft and powerful U-shape magnet enclosed in 6 cm diameter cover ... ... Dozen **£18. 0. 0.** Each **£1.13. 0.** *b*

SS-450
ORBITAL MIXER, for producing a vigorous vortex mixing action in the contents of test tubes and small containers. The mixer comprises a rubber cup mounted eccentrically on a ball race on a stainless steel rod which fits the hollow shaft of the stirrer. In use, the test tube is held in the hand and the bottom of the tube is pressed into contact with the rubber cup. The two then orbit smoothly in contact until the tube is withdrawn. There is no need to stop the motor for this purpose.
Each **£1.10. 0.** *b*
For illustration see opposite page.



SS-455

SS-455
CHUCK, 6·35 mm ($\frac{1}{4}$ in) with 20 cm stainless steel shaft, to convert hollow shaft motor for conventional fixed length rotors Dozen **£8. 5. 0.** Each **£0.15. 0.** *b*
For rotors to fit chuck, see SS-544 to SS-556 in List No. sequence.



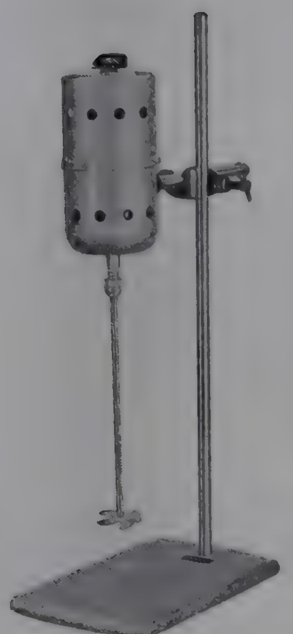
SS-460

SS-460
PULLEY, 2-step, 2·5 and 3·75 cm diameter with 20 cm stainless steel shaft.
Dozen **£9. 10. 0.** Each **£0. 17. 6.** *b*

All items on this page normally available from stock.

Gallenkamp VARIABLE SPEED STIRRERS

TWO MODELS WITH TEN-STEP SPEED CONTROLS AND CHUCKS TO ACCEPT 6·35 mm (¼ in) DIA. ACCESSORIES



SS-530 with SS-544

HIGH SPEED MODEL

- **Up to 2500 rev/min**
- **1/75 hp universal motor**
- **13 mm stainless steel support tube encloses the supply cable**

SS-530

STIRRER, variable speed, *Gallenkamp*, fully enclosed with built-in rotary rheostat controlling the speed in ten fixed steps up to 2500 rev/min. Fitted with a chuck to accept stirring rotors having 6·35 mm diameter shafts. For a.c. or d.c. supplies. **Without accessories.**

For 220/240V	Each	**£13. 0. 0.**	*b*
For 200/210V	Each	**£13. 0. 0.**	*bN*
For 110/120V	Each	**£13. 0. 0.**	*bN*

SS-535

STIRRER KIT, variable speed, *Gallenkamp*, comprising stirrer SS-530, stainless steel rotor SS-544, glass rotor SS-550, polythene rotor SS-552 and pulley SS-556.

For 220/240V	Each	**£15. 0. 0.**	*b*
For 200/210V	Each	**£15. 0. 0.**	*bN*
For 110/120V	Each	**£15. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

SS-536	**Brushes, for motor ... ...**	**Pair**	**£0. 5. 3.**	**b**
SS-538	**Spare chuck ... ...**	**Each**	**£0. 8. 6.**	**b**

SS-540
with accessories on stand

DUAL SPEED-RANGE MODEL

- **60 to 600 and 400 to 4000 rev/min**
- **1/30 hp geared motor; maximum torque 2·5 kgf cm**
- **13 mm stainless steel support tube encloses the supply cable**

SS-540

STIRRER, variable speed, *Gallenkamp*, **geared.** The speed of the motor is controlled in ten steps by a separate control unit incorporating a choke transformer connected to the motor by a 6 ft length of cable. A chuck which accepts 6·35 mm diameter stirrers or other accessories may be fitted either to the shaft at one end of the motor, for speeds up to 4000 rev/min or to the gearbox output shaft for speeds up to 600 rev/min. For a.c. single phase supplies only. **Without accessories.**

For 220/240V	Each	**£20. 10. 0.**	*g*
For 200/210V	Each	**£21. 0. 0.**	*gN*
For 110/120V	Each	**£21. 0. 0.**	*gN*

When ordering please state voltage and nature of supply.

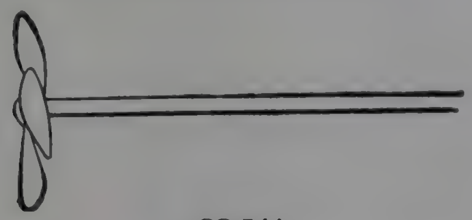
REPLACEMENT PARTS

SS-542	**Brushes, for motor**	**Pair**	**£0. 2. 6.**	**b**
SS-538	**Spare chuck. For price see entry in List No. sequence.**			

Items on this page normally available from stock except those coded *N*.

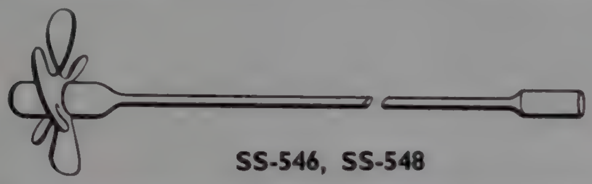
Gallenkamp STIRRER ACCESSORIES

ROTORS to fit 6·35 mm (¼ in) chucks.



SS-544

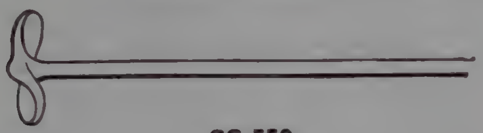
SS-544
ROTOR, stainless steel, with 20 cm shaft and 4-bladed 4·5 cm impeller. Dozen **£7. 0. 0.** Each **£0. 12. 9.** *b*



SS-546, SS-548

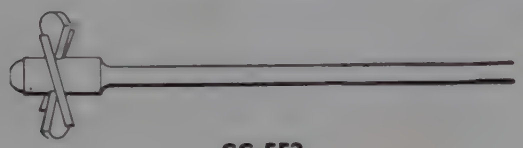
SS-546
ROTOR, stainless steel, with 25 cm flexible shaft and 4-bladed 4·5 cm self-aligning impeller.
Dozen **£17. 10. 0.** Each **£1. 12. 0.** *b*

SS-548
ROTOR, stainless steel, with 46 cm flexible shaft and 4-bladed 5·7 cm self-aligning impeller.
Dozen **£18. 10. 0.** Each **£1. 14. 0.** *b*



SS-550

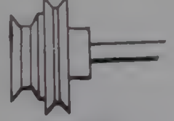
SS-550
ROTOR, glass, with 20 cm shaft ground to fit chuck and 2-bladed 3 cm impeller.
Dozen **£4. 10. 0.** Each **£0. 8. 6.** *a*



SS-552

SS-552
ROTOR, polythene, with 20 cm steel reinforced shaft and 4-bladed 4·5 cm impeller.
Dozen **£5. 18. 0.** Each **£0. 10. 9.** *b*

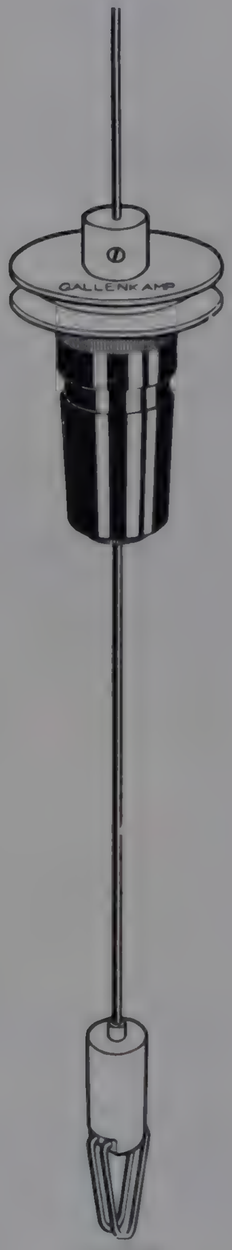
SS-554
FLEXIBLE DRIVE, enclosed in armoured covering, 46 cm long and bored at driving end to accept 6·35 mm stirrer shaft ... Dozen **£31. 0. 0.** Each **£2. 16. 0.** *b*



SS-556

SS-556
PULLEY, 2-step, 2·5 and 3·75 cm dia. with 7·5 cm stainless steel shaft.
Dozen **£7. 5. 0.** Each **£0. 13. 3.** *b*

MX-720 PULLEYS, 2 speed.
MX-760 DRIVING BELTS, nylon braided.
For details see entries in List No. sequence.



SS-570

SS-570
STIRRER, *Gallenkamp,* **standard joint, vacuum pattern,** comprising a hard plastics adapter ground externally to a standard cone size 24/29 and fitted internally with a ball-bearing on which the driving pulley rotates. The latter is drilled to accept the thin stainless steel stirrer shaft whose flexibility provides exceptionally vibrationless operation. A vacuum tight stuffing box is fitted in the lower end of the adapter and only makes contact with the thin stirrer shaft so that friction is negligible even under vacuum. The stirrer shaft is secured by a set screw and is adjustable for working depth. With stainless steel collapsable link rotor. Can be driven from any *Gallenkamp* stirrer fitted with a pulley.
Each **£3. 0. 0.** *b*

All items on this page normally available from stock.

Gallenkamp MAGNETIC STIRRERS

SS-610 with rod

Compact variable speed stirrers, available with or without hotplate, which produce from gentle to vigorous stirring action suitable for:

- Titrations
- Controlled precipitations
- Rapid preparation of solutions
- Agitation during electrochemical tests
- Agitation of sterile liquids
- Agitation within vacuum systems

FEATURES

- 10 speeds to 1325 rev/min
- Start on slowest speed setting
- Range of magnetised followers available
- Silent—brushless motors
- Controls enclosed in enamelled metal case
- Fixing for support rod

SS-610

MAGNETIC STIRRER, *Gallenkamp*, as specification, with one each 25 and 45 mm magnetic followers enclosed in polypropylene (SS-636). **Without rod.**

For 200/240V 50 Hz single phase supplies.
Each **£14. 10. 0.** *b*
For 110/120V 60 Hz single phase supplies.
Each **£15. 0. 0.** *bN*

When ordering please state voltage and nature of supply.

SS-615 with rod

SS-615

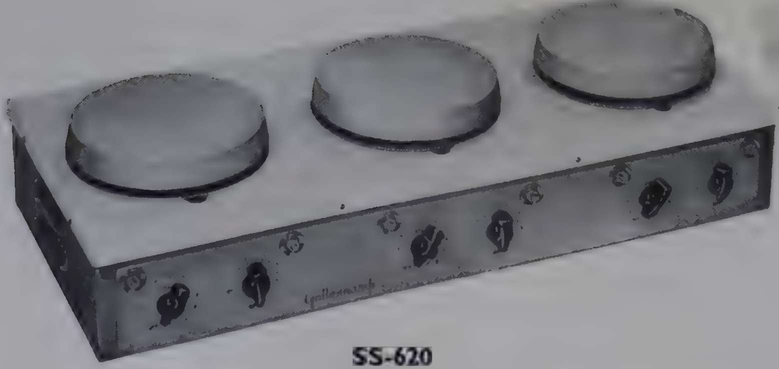
MAGNETIC STIRRER/HOTPLATE, *Gallenkamp*, as specification, with aluminium hotplate with totally enclosed sheathed heating element. Heat input controlled by Simmerstat in control box. Maximum hotplate temperature approx. 450°C. With one each 25 and 45 mm magnetic followers enclosed in polypropylene (SS-636). **Without rod.**

For 200/240V 50 Hz single phase supplies.
Each **£22. 10. 0.** *b*
For 110/120V 60 Hz single phase supplies.
Each **£23. 0. 0.** *bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PART

SS-617 Hotplate, 400W ... ... Each £3. 16. 0. c



SS-620

SS-620

MAGNETIC STIRRER/HOTPLATE, 3-TEST, *Gallenkamp*, as SS-615 but comprising three hotplates, three sets of controls and three each 25 and 45 mm magnetic followers enclosed in polypropylene (SS-636). **Without rods.**

For 200/240V 50 Hz single phase supplies.
Each **£69. 0. 0.** *b*
For 110/120V 60 Hz single phase supplies.
Each **£69. 10. 0.** *bN*

When ordering please state voltage and nature of supply.

For suitable rods see SM-420, SM-422 and SM-424 in List No. sequence.

Items on this page normally available from stock except those coded *N*.

MAGNETISED FOLLOWERS

SS-626

MAGNETISED FOLLOWER SET, comprising one each all sizes SS-630 (glass) and SS-636 (polypropylene).
Set **£2. 10. 0.** c

SS-630

MAGNETISED FOLLOWERS, encased in glass.

Magnet length	6	13	19	25	38	50 mm	
Dozen	**26/6**	**29/–**	**31/–**	**35/–**	**38/–**	**41/–**	b
Each	**3/9**	**3/11**	**4/1**	**4/5**	**4/7**	**4/10**	

SS-634

MAGNETISED FOLLOWERS, encased in PTFE.

Magnet length	12	20	40	60 mm	
Each	**10/6**	**11/–**	**13/–**	**15/–**	c

SS-636

MAGNETISED FOLLOWERS, encased in polypropylene.

Magnet length	12	25	45	60 mm	
Dozen	**35/–**	**50/–**	**60/–**	**90/–**	m
Each	**4/5**	**5/6**	**6/4**	**8/6**	

SS-642

RETRIEVER, for magnetic followers, comprising permanent magnet encased in glass tube 8 mm dia., 30 cm long ... ... Each **£0. 5. 6.** b

SS-680

STIRRER, constant speed, with fully enclosed 1/20 hp electric motor giving an on-load speed of approximately 2,000 rev/min, particularly suitable for mixing low viscosity liquids in vats and tanks. The telescopic hollow stainless steel shaft is locked rigidly at any length between 16 and 57 cm by a taper chuck at the junction of the two sections. A universally adjustable ball and socket joint enables the stirrer to be positioned as required and the mounting clamp has an effective maximum jaw opening of 47 mm. For 230/250V a.c. single phase supplies.
Each **£63. 0. 0.** *fN*

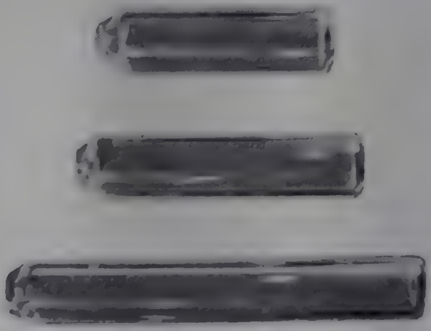
When ordering please state voltage and nature of supply.

For high speed MIXER-EMULSIFIERS see MU-960 and MU-965 in List No. sequence.

SS-760

STIRRER, COMPRESSED AIR, *Turbinia*, for pressures above 1 kgf/cm² giving a speed range from 10 to 10,000 rev/min. This stirrer, which has a consumption of 30 l/min at 2 kgf/cm², will vigorously stir 1 litre of water when operated on 3·5 kgf/cm². The air is led down the hollow handle through a jet and is finally forced out of an annular ring surrounding the plastics chuck. The latter takes stirring rotors up to 6·35 mm (¼ in) diameter. With two glass stirrers and bosshead for mounting on retort stand.
Each **£16. 10. 0.** *f*

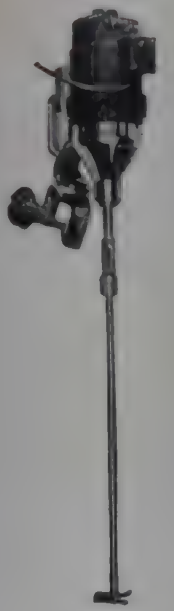
SEMI-MICRO STIRRER, which can be driven by **COMPRESSED AIR, VACUUM** or **WATER** see Q-MU8/0 in the *Quickfit* Section.

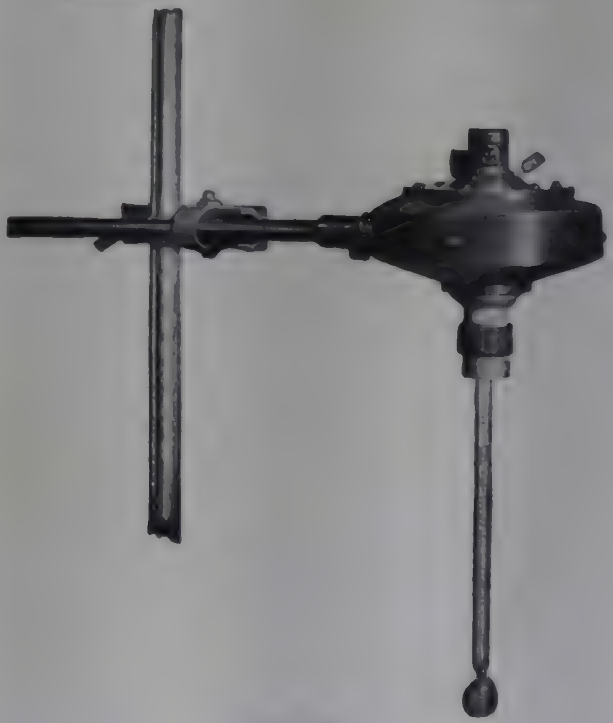

SS-630

SS-634

SS-636

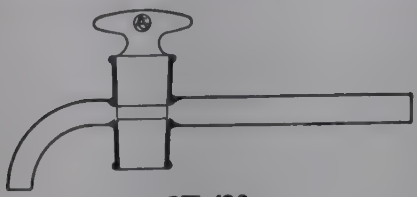
SS-642


SS-680


SS-760

Items on this page normally available from stock except those coded *N*.

ASPIRATOR STOPCOCKS



ST-420

ST-420

STOPCOCKS, AG **aspirator, soda-lime glass,** single straight bore.

Bore of key	3	5	7	10 mm	
Tube dia., approx.	8	9	11	15 mm	
Dozen	**104/–**	**140/–**	**240/–**	**330/–**	*a*
Each	**9/6**	**12/9**	**22/–**	**30/–**	

AU-365

STOPCOCK, aspirator, borosilicate glass, suitable for 29/32 socket.

AU-367

STOPCOCK, aspirator, *Flexicon,* borosilicate glass, with two PVC rings around the joint to give a degree of flexibility. Suitable for 29/32 socket outlets.

AU-445

STOPCOCK, aspirator, polythene, 8 mm bore, suitable for 29/32 socket.

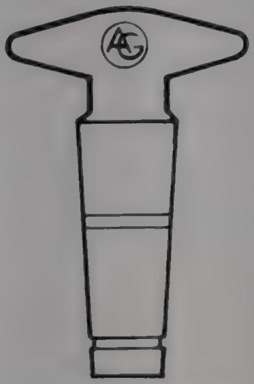
AU-447

STOPCOCK, aspirator, polythene, 12 mm bore with air vent. Suitable for 29/32 socket.

For full details and prices of above see entries in List No. sequence.

STOPCOCKS WITH INTERCHANGEABLE KEYS

These stopcocks are manufactured in accordance with the dimensions of the U.S.A. standard CS-21. The length of ground zone is 30 mm with a diameter at the bore of 12 mm. Special production techniques ensure perfection of form and complete interchangeability. All AG ₮ stopcocks are fitted with a rust resistant retaining spring and are listed under List Nos. ST-451, ST-453, ST-501, ST-505, ST-511 and ST-514.



ST-440 ST-442

INTERCHANGEABLE STOPCOCK KEYS

ST-440

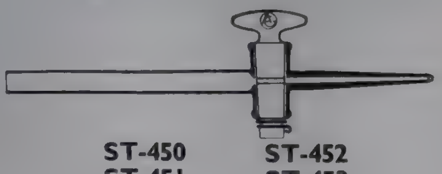
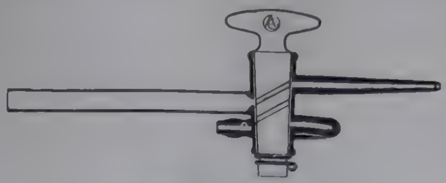
STOPCOCK KEYS, AG, ₮ **interchangeable,** of soda-lime glass ... Dozen **£2. 19. 0.** Each **£0. 6. 2.** *a*

ST-442

STOPCOCK KEYS, AG, ₮ **interchangeable,** of borosilicate glass. Dozen **£2. 19. 0.** Each **£0. 6. 2.** *a*

BURETTE STOPCOCKS 1—2 mm BORE

with retaining springs and 7 mm o.d. side tube

PATTERN				Soda-lime glass	Borosilicate glass	
 ST-450 ST-452 ST-451 ST-453	Straight bore with capillary jet, for sealing to burettes	Individually fitted keys	Dozen Each	**ST-450** **82/–** **7/10**	**ST-452** **96/–** **9/–**	*a*
		Interchangeable ₮ keys	Dozen Each	**ST-451** **130/–** **11/9**	**ST-453** **130/–** **11/9**	*a*
 ST-460 ST-462	Double oblique bore with capillary jet and bent filling tube, for sealing to burettes	Individually fitted keys	Dozen Each	**ST-460** **150/–** **13/6**	**ST-462** **165/–** **15/–**	*a*

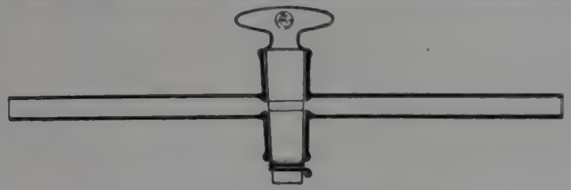
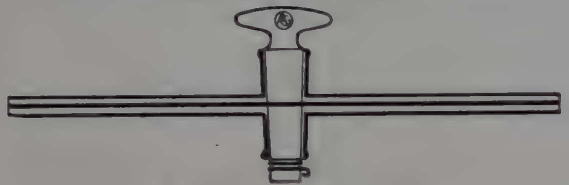
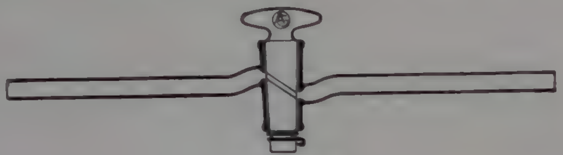
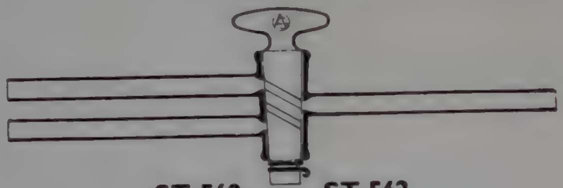
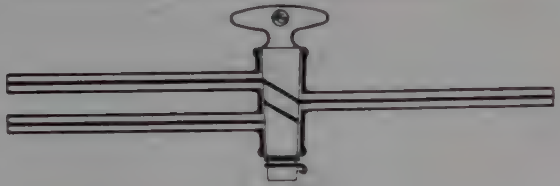
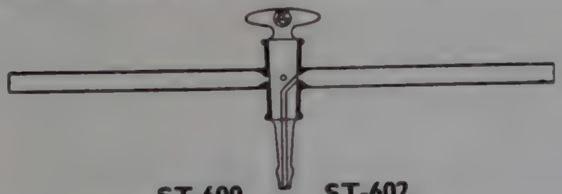
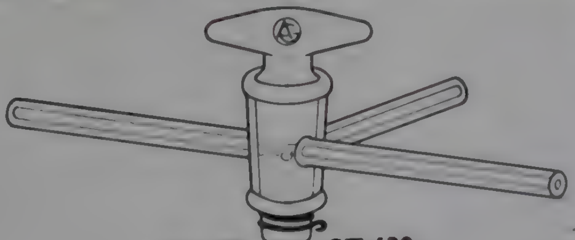
For spare ₮ keys see ST-440 and ST-442 entry above.

For spare retaining springs see ST-650 in List No. sequence.

All items on this page normally available from stock.

STOPCOCKS 1—2 mm BORE

with retaining springs and 7 mm o.d. side tubes

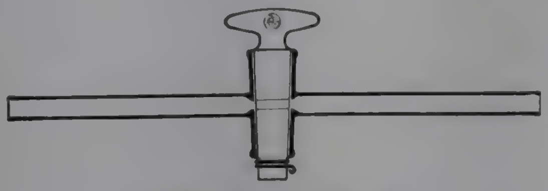
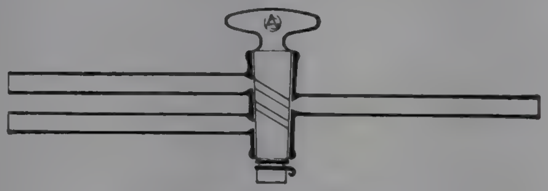
PATTERN				Soda-lime glass	Borosilicate glass	
 ST-500 ST-504 ST-501 ST-505	Single straight bore with wide bore side tubes	Individually fitted keys	Dozen Each	ST-500 78/- 7/8	ST-504 98/- 9/-	a
		Interchangeable $ keys	Dozen Each	ST-501 118/- 10/9	ST-505 118/- 10/9	a
 ST-510 ST-512 ST-511 ST-514	Single straight bore with capillary side tubes	Individually fitted keys	Dozen Each	ST-510 90/- 8/6	ST-512 104/- 9/6	a
		Interchangeable $ keys	Dozen Each	ST-511 125/- 11/3	ST-514 125/- 11/3	a
 ST-530	Single oblique bore with wide bore side tubes	Individually fitted keys	Dozen Each	— —	ST-530 140/- 12/9	a
 ST-560 ST-562	Double oblique bore with wide bore side tubes	Individually fitted keys	Dozen Each	ST-560 170/- 15/6	ST-562 205/- 18/6	a
 ST-570	Double oblique bore with capillary side tubes	Individually fitted keys	Dozen Each	— —	ST-570 215/- 19/6	a
 ST-600 ST-602	Straight bore with second bore to connect either side tube to tail. **Without retaining spring**	Individually fitted keys	Dozen Each	ST-600 170/- 15/6	ST-602 185/- 17/-	a
 ST-622 ST-630	T-bore with wide bore side tubes and third side tube perpendicular to the other two	Individually fitted keys	Dozen Each	ST-620 130/- 11/9	— —	a
	T-bore as ST-620 but with capillary side tubes	Individually fitted keys	Dozen Each	ST-622 135/- 12/3	ST-630 135/- 12/3	a

For spare $ keys see ST-440 and ST-442 in List No. sequence. For spare retaining springs see ST-650 in List No. sequence.

All items on this page normally available from stock.

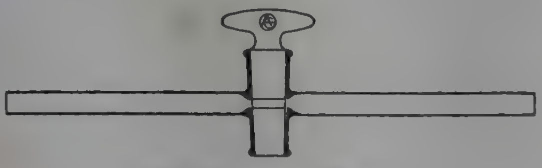
STOPCOCKS 3—4 mm BORE

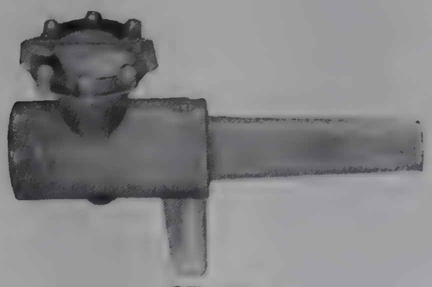
with retaining springs, 8 mm o.d. side tubes and individually fitted keys

PATTERN			Soda-lime glass	Borosilicate glass	
 **ST-632** **ST-633**	Single straight bore with wide bore side tubes	Dozen Each	**ST-632** 90/- 8/6	**ST-633** 120/- 11/-	*a*
 **ST-636** **ST-637**	Double oblique bore with wide bore side tubes	Dozen Each	**ST-636** 180/- 16/6	**ST-637** 220/- 20/-	*a*

STOPCOCKS 5—11 mm BORE

with individually fitted keys

PATTERN				Soda-lime glass	Borosilicate glass	
 **ST-645** **ST-646**	Single straight bore with wide bore side tubes	5–6 mm bore 9 mm o.d. side tube	Dozen Each	**ST-645** 130/- 11/9	**ST-646** 150/- 13/6	*a*
		7–8 mm bore 11 mm o.d. side tube	Dozen Each	185/- 17/-	285/- 26/-	*a*
		10–11 mm bore 15 mm o.d. side tube	Dozen Each	300/- 27/-	340/- 31/-	*a*



ST-740

STOPCOCK RETAINING SPRINGS

ST-650

STOPCOCK RETAINING SPRINGS, rust resistant, as fitted to many Ⓐ stopcocks.
Gross **£1. 18. 0.** Dozen **£0. 4. 7.** *b*

PLASTICS STOPCOCKS

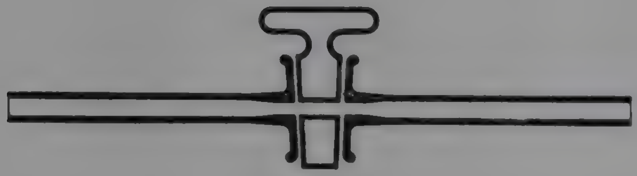
ST-740

STOPCOCK, nylon, with 8 mm inlet tube at right angles to 6 mm outlet tube ... Each **£0. 7. 6.** *m*

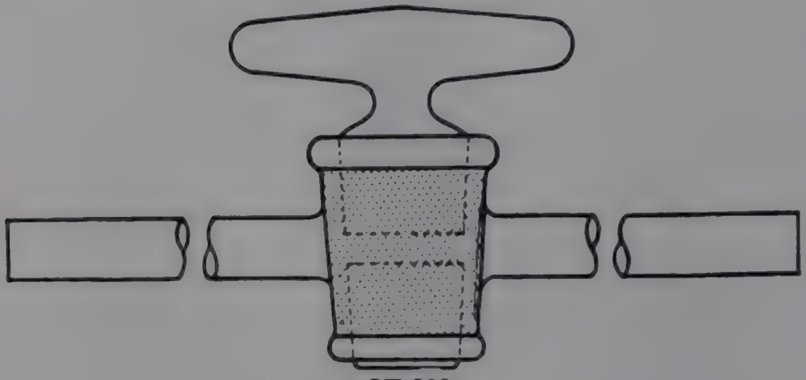
SOLENOID VALVE, electrically operated, see ST-760 in Addenda.

All items on this page normally available from stock.

VACUUM STOPCOCKS



ST-780



ST-800

ST-780

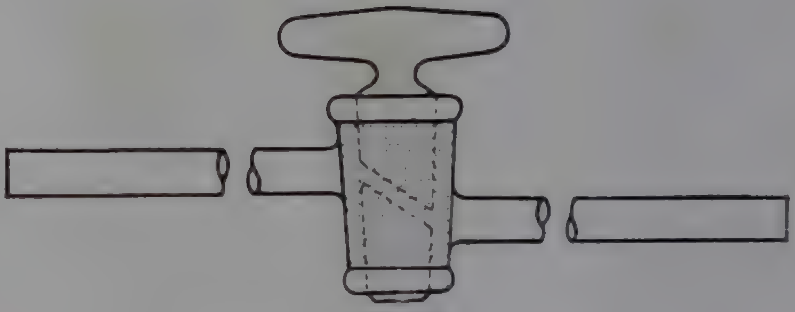
STOPCOCKS, vacuum, *Pyrex brand* glass, single straight bore, with sealed hollow plug.

Bore of key	2	4	6	8	10	mm
Std. pack. qty.	4	4	4	4	4	
Std. pack	**90/-**	**93/-**	**97/-**	**135/-**	**152/-**	d
Each	**25/-**	**26/-**	**27/-**	**37/7**	**42/4**	

ST-800

STOPCOCKS, vacuum, *Quickfit*, borosilicate glass, single straight bore with two side tubes.

Ref. No.	TH1C/1	TH1/3	TH1/6	TH1/8	
Bore of key	1	3	6	8	mm
Bore of side tube	2	4	7	10	mm
Six	**108/-**	**119/-**	**150/-**	**193/-**	m
Each	**20/-**	**22/-**	**27/9**	**35/9**	

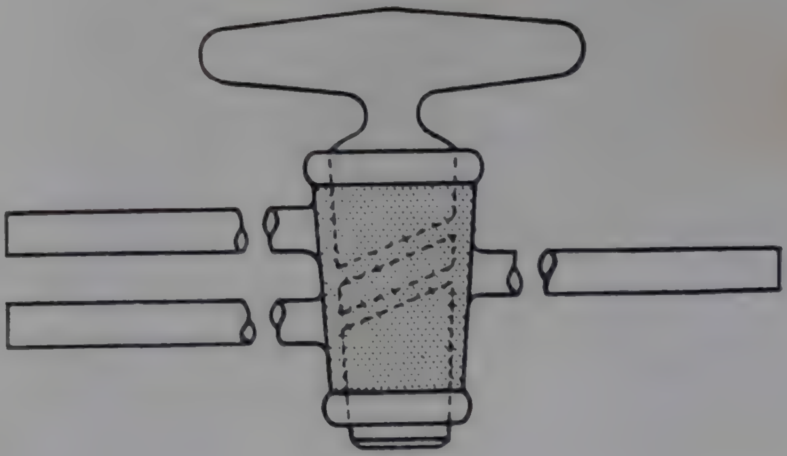


ST-810

ST-810

STOPCOCKS, vacuum, *Quickfit*, borosilicate glass, single oblique bore with two side tubes.

Ref. No.	TH2C/1	TH2/3	TH2/6	
Bore of key	1	3	6	mm
Bore of side tube	2	4	7	mm
Six	**119/-**	**119/-**	**173/-**	m
Each	**22/-**	**22/-**	**32/-**	



ST-830

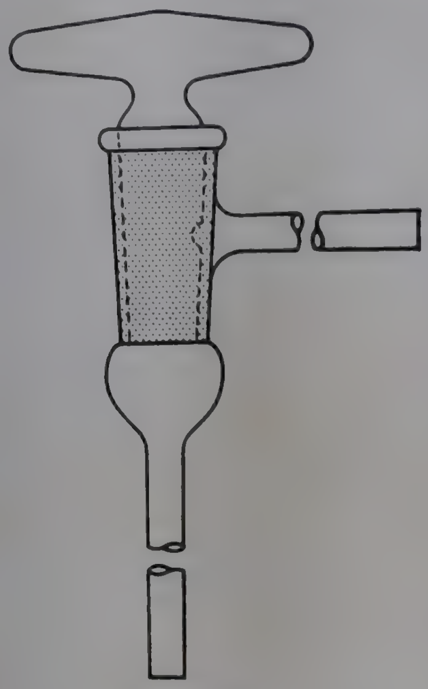
ST-830

STOPCOCKS, vacuum, *Quickfit*, borosilicate glass, double oblique bore with three side tubes.

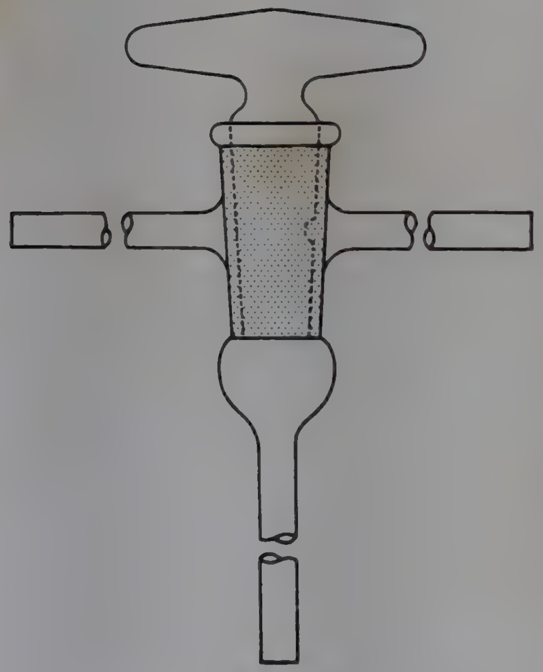
Ref. No.	TH3/1	TH3/3	
Bore of key	1	3	mm
Bore of side tube	2	4	mm
Six	**163/6**	**174/-**	m
Each	**30/3**	**32/3**	

Metal vacuum stopcocks for bench fitting see entry under FURNITURE.

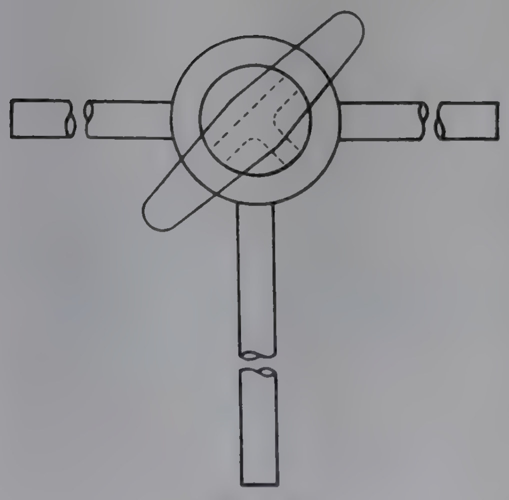
All items on this page normally available from stock.



ST-840



ST-860



ST-870

VACUUM STOPCOCKS

(continued)

ST-840

STOPCOCKS, vacuum, *Quickfit,* **borosilicate glass,** L-shape with side and tail tubes.

Ref. No.	TH6/3	TH6/6	TH6/8	
Bore of key	3	6	8 mm	
Bore of side tube	4	7	10 mm	
Six	**147/–**	**168/6**	**204/–**	*m*
Each	**27/3**	**31/3**	**37/9**	

ST-860

STOPCOCKS, vacuum, *Quickfit,* **borosilicate glass,** L-shape, with tail and two side tubes.

Ref. No.	TH8/2	TH8/6	TH8/8	
Bore of key	3	6	8 mm	
Bore of side tube	4	7	10 mm	
Six	**148/6**	**178/–**	**213/–**	*m*
Each	**27/6**	**33/–**	**39/6**	

ST-870

STOPCOCKS, vacuum, *Quickfit,* **borosilicate glass,** T-bore, with three side tubes.

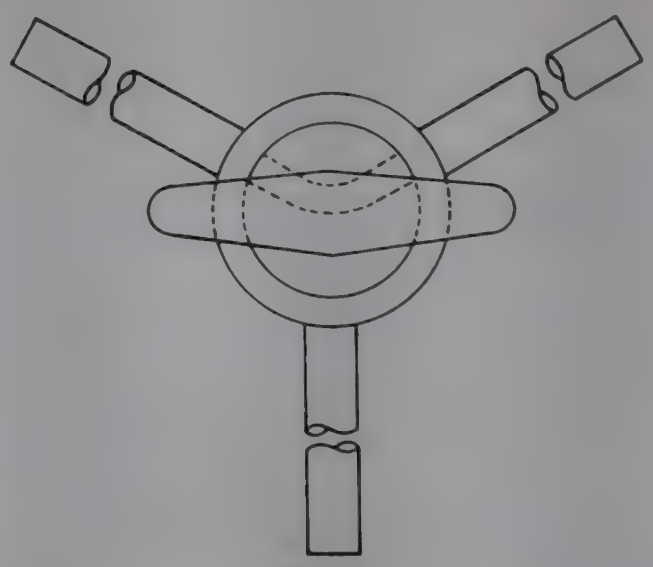
Ref. No.	TH4/3	TH4/6	
Bore of key	3	6 mm	
Bore of side tube	4	7 mm	
Six	**175/6**	**237/6**	*m*
Each	**32/6**	**44/–**	

ST-880

STOPCOCK, vacuum, *Quickfit* TH5/3, **borosilicate glass,** V-bore, with three side tubes. Bore of key 3 mm, bore of side tubes 4 mm.

Six **£8. 14. 0.** Each **£1. 12. 3.** *m*

Quickfit **stopcock adapters** see QUICKFIT APPARATUS.



ST-880

All items on this page normally available from stock.

STOPCOCK KEY REMOVER

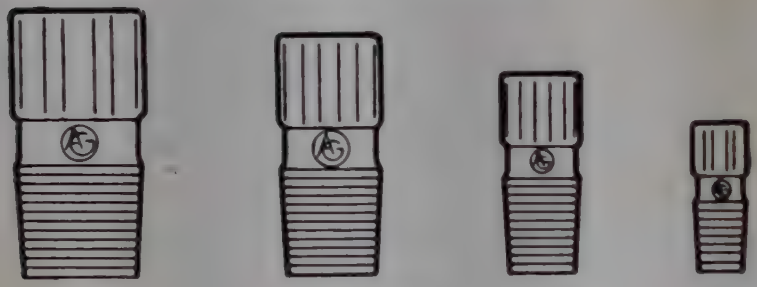
ST-970

ST-970

STOPCOCK KEY REMOVER, for removing frozen or otherwise fixed stopcock keys in laboratory glassware. Comprises a strong steel frame with a steel screw and an aluminium block which is recessed to take the handle of the stopcock key. The block is tapered to accept stopcock barrels of different diameters. By exerting a steady pressure with the screw, the key is removed.

Each **£3. 14. 0.** c

GLASS STOPPERS



SU-520

SU-520

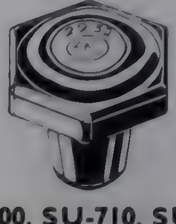
STOPPERS, (AG), borosilicate glass, to BS 572, with fluted hexagonal head, suitable for *Technico* volumetric cylinders and flasks and (AG) separating funnels. Supplied in standard packs of 6 stoppers of 1 size.

Size	10/13	12/14	14/15	16/16	
To fit cylinders	5/10	—	25/50	— ml	
To fit flasks	1 to 50	100	250	500 ml	
To fit sep. funnels	—	—	25	— ml	
Dozen packs	**156/–**	**170/–**	**186/–**	**186/–**	*a*
Pack of 6	**14/3**	**15/6**	**17/–**	**17/–**	
Each	**3/10**	**4/–**	**4/3**	**4/3**	

Size	19/17	24/20	29/22	
To fit cylinders	100	250/500	— ml	
To fit flasks	1000	2000	— ml	
To fit sep. funnels	50/100	250/500	1000/2000 ml	
Dozen packs	**206/–**	**230/–**	**276/–**	*a*
Pack of 6	**19/–**	**21/–**	**25/–**	
Each	**4/7**	**4/10**	**5/6**	

STOPPERS, glass, to BS 572 see also *Quickfit* **apparatus.**

PLASTICS STOPPERS



SU-700, SU-710, SU-712

SU-700

STOPPERS, (AG), polypropylene, to BS 572 closed at lower end, with dustproof hexagonal head. Coloured red with grey disk insert. Suitable for *Technico* volumetric cylinders and flasks and (AG) separating funnels. These stoppers can be sterilised. Supplied in standard packs of 6 stoppers of 1 size.

Size	10/13	12/14	14/15	
To fit cylinders	5/10	—	25/50 ml	
To fit flasks	1 to 50	100	250 ml	
To fit sep. funnels	—	—	25 ml	
Dozen packs	**56/–**	**59/–**	**60/–**	*b*
Pack of 6	**6/–**	**6/2**	**6/4**	

Size	16/16	19/17	24/20	
To fit cylinders	—	100	250/500 ml	
To fit flasks	500	1000	2000 ml	
To fit sep. funnels	—	50/100	250/500 ml	
Dozen packs	**60/–**	**72/–**	**78/–**	*b*
Pack of 6	**6/4**	**7/2**	**7/8**	

SU-710

STOPPERS, (AG), polypropylene, to BS 572, with dustproof hexagonal head and closed lower end. Coloured red with grey disk insert. These stoppers can be sterilised and are suitable for reagent bottles BT-140, BT-142, BT-400, BT-402 and other apparatus with corresponding joint sizes. Supplied in standard packs of 6 stoppers of 1 size.

Size	19/22	24/29	29/32	
Dozen packs	**72/–**	**80/–**	**88/–**	*b*
Pack of 6	**7/2**	**7/10**	**8/3**	

SU-712

STOPPERS, (AG), polypropylene, to BS 572 as SU-710 but in other colours suitable for colour coding. Available in white, yellow, green or blue, all with grey disk insert. Supplied in standard packs of 4 stoppers of 1 size, all the same colour or 1 each of 4 colours.

Size	19/22	24/29	29/32	
Dozen packs	**55/–**	**60/–**	**66/–**	*b*
Pack of 4	**5/10**	**6/4**	**6/8**	

When ordering please state whether single colour or mixture is required.

ASBESTOS STOPPERS see AR-440
CORK STOPPERS see CV-010 to CV-030 inclusive
IODINE FLASK STOPPERS see FJ-262 and *Quickfit* Apparatus
STOPPER TIES see EV-862

All items on this page normally available from stock.

RUBBER STOPPERS

Gallenkamp
RUBBER STOPPERS to BS 2775
List No. SU-760
Type SOLID
Quantity 12
Size 19
LONDON—WIDNES—STOCKTON-ON-TEES
MADE IN ENGLAND

SU-760

A range of rubber stoppers to the requirements of BS 2775. Each stopper is numbered with the diameter of the small end in mm, which corresponds to the stopper size number. Numbers 3 to 29 have a taper of 1 in 8, numbers 31 to 71 a taper of 1 in 7 and numbers 75 to 105 a taper of 1 in 5·5.

SU-760
STOPPERS, solid, natural red rubber, hardness 41–50 BS degrees, covering complete range of sizes.

SU-762
STOPPERS, rubber, solid. Stoppers SU-760 in pack of 9 dozen assorted sizes from 5 mm to 25 mm as follows:
12 each, size Nos 9, 10, 11, 13.
8 each, size Nos 7, 8, 15.
6 each, size Nos 5, 6, 17, 19.
4 each, size Nos 21, 23, 25.
Dozen packs **£19. 0. 0.** Standard pack **£1. 15. 0.** c

SU-765
STOPPERS, one hole, natural red rubber, hardness 41–50 BS degrees, covering size range Nos. 5 to 43.

SU-780
STOPPERS, solid, grey neoprene, free from sulphur, hardness 41–50 BS degrees, covering complete range of sizes.

SU-800
STOPPERS, solid, silicone rubber, hardness 50–75 BS degrees, non-toxic, translucent, will withstand repeated sterilisation and storage in tropical conditions, covering size range 3 to 33.

For price details see facing page.

BORING HOLES IN RUBBER STOPPERS

Stoppers SU-760, SU-780 and SU-800 can be supplied to order with holes bored to customer requirements. The price quoted below is additional to the cost of the stoppers and the dozen rate applies only to 12 or more stoppers bored with the same size of hole.

Dozen holes **£0. 7. 6.** Each hole **£0. 2. 6.** *cN*

SUBA-SEAL RUBBER STOPPERS

SU-850
STOPPERS, Suba-seal, rubber, solid, for narrow mouth containers, with turnover flange and suction serrations.

Size No.	9	13	17	21	
Bottom diameter	6·5	8	9·5	11 mm	
Dozen packs	**36/-**	**39/-**	**45/-**	**49/-**	c
Pack of 10	**4/6**	**4/8**	**5/2**	**5/6**	

Size No.	25	29	33	37	
Bottom diameter	12·5	14	16	17·5 mm	
Dozen packs	**51/-**	**53/-**	**59/-**	**74/-**	c
Pack of 10	**5/8**	**5/8**	**6/2**	**7/4**	

Size No.	41	45	49	
Bottom diameter	19	20·5	22 mm	
Dozen packs	**88/-**	**125/-**	**140/-**	c
Pack of 10	**8/3**	**11/3**	**12/9**	

SU-850

Items on this page normally available from stock except those coded *N*.

RUBBER STOPPERS

DIMENSIONS AND PRICES

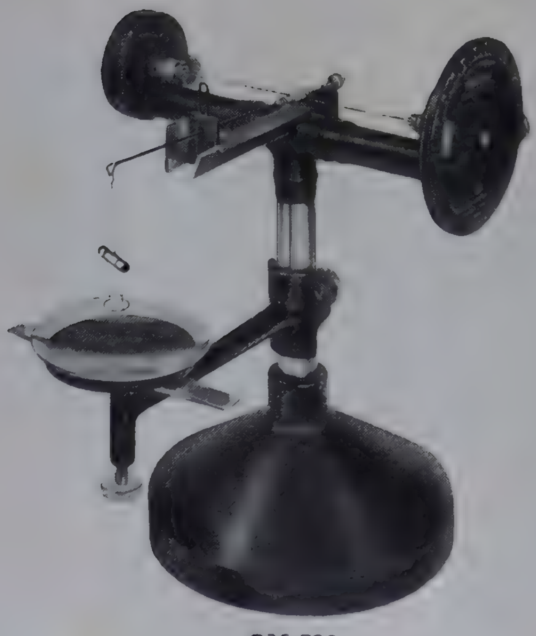
Stopper Size No.	Dimensions			SU-760		SU-780		SU-800	
	Bottom dia. mm	Top dia. mm	Height mm	Dozen packs of 12	Pack of 12	Dozen packs of 12	Pack of 12	Dozen packs of 12	Pack of 12
3	3	4·5	12	22/-	3/5	25/6	3/8	84/-	8/-
4	4	5·8	14	22/-	3/5	25/6	3/8	84/-	8/-
				SU-760 and SU-765					
5	5	7	16	22/-	3/5	25/6	3/8	84/-	8/-
6	6	8	16	22/-	3/5	27/6	3/10	94/-	8/9
7	7	9	16	23/6	3/6	29/6	4/-	118/-	10/9
8	8	10·5	20	23/6	3/6	29/6	4/-	180/-	16/6
9	9	11·5	20	25/6	3/8	32/-	4/2	205/-	18/6
10	10	12·5	20	27/6	3/10	33/-	4/3	255/-	23/6
11	11	14	24	29/6	4/-	34/-	4/4	410/-	37/-
13	13	16	24	32/-	4/2	35/-	4/5	480/-	44/-
								Pack of 12	Each
15	15	18	24	35/-	4/5	37/-	4/6	50/-	5/6
17	17	20·3	26	41/-	4/10	47/-	5/4	80/-	7/10
19	19	22·5	28	49/-	5/6	51/-	5/8	92/-	8/9
21	21	24·5	28	64/-	6/6	70/-	7/-	102/-	9/6
23	23	26·5	28	70/-	7/-	82/-	7/10	118/-	10/9
25	25	28·5	28	84/-	8/-	98/-	9/-	135/-	12/3
27	27	31	32	106/-	9/9	120/-	11/-	185/-	17/-
29	29	33	32	125/-	11/3	145/-	13/3	205/-	18/6
31	31	36	35	180/-	16/6	210/-	19/-	280/-	25/6
33	33	38·5	38·5	205/-	18/6	235/-	21/6	310/-	28/-
35	35	40·5	38·5	230/-	21/-	255/-	23/6		
37	37	42·5	38·5	250/-	23/-	265/-	24/-		
39	39	44·5	38·5	265/-	24/-	300/-	27/-		
41	41	47	42	280/-	25/6	320/-	29/-		
43	43	49	42	320/-	29/-	370/-	34/-		
				SU-760					
				Pack of 12	Each	Pack of 12	Each		
45	45	51	42	30/-	4/-	35/-	4/5		
49	49	55	42	35/-	4/5	46/-	5/2		
53	53	59·5	45·5	43/-	5/-	56/-	6/-		
57	57	64	49	53/-	5/8	68/-	6/10		
62	62	69	49	70/-	7/-	90/-	8/6		
67	67	74	49	84/-	8/-	102/-	9/6		
71	71	78	49	96/-	9/-	116/-	10/6		
75	75	85	54	140/-	12/9	210/-	19/-		
79	79	89	54	145/-	13/3	225/-	20/6		
86	86	96	54	170/-	15/6	255/-	23/6		
92	92	102	54	200/-	18/-	295/-	27/-		
99	99	109	54	220/-	20/-	330/-	30/-		
105	105	116·5	63·5	240/-	22/-	420/-	38/-		

When ordering please state List No. and stopper Size No.

All items on this page normally available from stock (code c).

SV-800

SV-840



SX-520

STROBOSCOPES

SV-800

STROBOSCOPE, *Flash-Tac*, a low priced portable instrument **fitted with a Xenon flash tube** giving 100 to 15,000 flashes/minute in three ranges. Flash duration 1 to 20 μs, and light intensity 50 to 100 lux depending upon range.

Flash speeds are indicated on a directly calibrated scale accurate to within ± 3%. External triggering facilities are provided. The flash tube and 12 cm reflector are at the rear of the instrument.

Dimensions 25 x 20 x 18 cm. Weight 3 kg.

For 200/250V 50 Hz single phase supplies.

Each **£36. 5. 0.** *f*

EMI STROBOSCOPES

Both instruments provide readings accurate within 1% on a calibrated illuminated 15 cm scale in terms of flashes per second and the equivalent shaft speed in rev/min. High flash intensity allows most speeds to be measured in a high level of ambient lighting. The speed range may be extended by observing every second, third or fourth revolution in subdued lighting conditions. The Xenon filled lamp gives a flash colour approximating daylight (5500°K). External triggering facilities are provided and the lamps may be removed for use away from the instruments. For use on 100/115V or 200/250V 50 or 60 Hz single phase supply.

	SV-830		**SV-840**	
Type	3D		6 (high power)	
Flash rate (rev/min)	Low	300–1500	Low	300– 1500
	High	1200–6000	High	1200– 6000
			Low × 10	3000–15,000
			High × 10	12,000–60,000
Flash duration (μs)	Low	16	Low	31–39
	High	9	High	14–16·5
			Low × 10	11–12·5
			High × 10	8·5–10·5
Intensity (thousands c.p.)	Low	200	Low	2000–1000
	High	100	High	920–400
			Low × 10	312–132
			High × 10	34–13·6
Dimensions (cm)	23 × 23 × 36		28 × 27 × 46	
Weight (kg)	14		19·5	
Each	£129. 0. 0. *fN*		£249. 0. 0. *fN*	

When ordering please state voltage and nature of supply.

SURFACE TENSION

For the rapid and direct determination of surface and inter-facial tension using the ring method of du Noüy.

Construction

A platinum-iridium ring is suspended from the end of a rigid arm which is secured to the centre of a torsion wire stretched between two clamps. The tension of this wire may be altered by rotating a knurled knob which moves over a scale fitted with a vernier calibrated 0–110 dynes/cm. The sample container is placed on a platform the height of which may be adjusted by a screw.

Operation

With the scale pointer at zero, the balance arm is made horizontal and the liquid surface is brought into contact with the ring. Rotation of the pointer increases the tension of the torsion wire until the ring is pulled free. The scale reading at this point is a direct measurement of the surface tension.

SX-520

SURFACE TENSION APPARATUS, *Cambridge*, as specification ... ... Each **£59. 0. 0.** *f*

ACCESSORIES AND REPLACEMENT PARTS

SX-522	**Glass plate, for surface and interfacial tests on petroleum products, to IP 90, with rod attachment and glass vessel**	Each	**£2. 15. 0.**	*f*
SX-523	**Platinum ring**	Each	**£3. 4. 0.**	*f*
SX-524	**Torsion wires**	Pack of 6	**£0. 7. 0.**	*f*

Items on this page normally available from stock except those coded *N*.

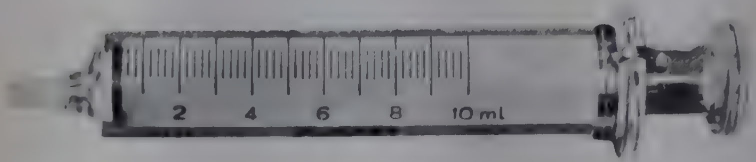
SYRINGES

ALL SYRINGES FOR INTERCHANGEABLE NEEDLES ARE LUER FITTING

***SY-410**

SYRINGES, all glass, for liquids. Made from heat resisting glass with calibrations widely spaced and indelibly marked. Pistons and barrels from any one size are interchangeable. **Without needle,** accepts any Luer fitting needle.

Capacity	1	2	5	10	20 ml	
Subdivision	0·1	0·2	0·2	0·2	1·0 ml	
Dozen	**59/–**	**59/–**	**94/–**	**125/–**	**165/–**	c
Each	**6/2**	**6/2**	**8/9**	**11/3**	**15/–**	

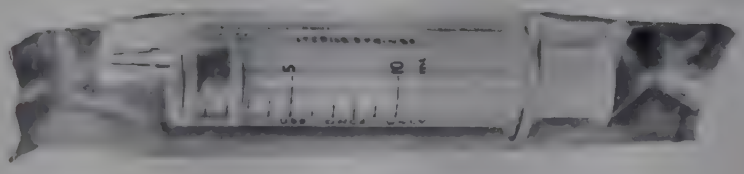


SY-410

SY-430

SYRINGES, plastics, disposable, for gases or liquids, radiation sterilised. With barrel and plunger of polystyrene and sealing piston of surgical rubber coated with inert silicone lubricant. Each syringe is separately packed in a sealed polythene envelope. The 1 ml size is the tuberculin type, the others to BS 1263. **Without needle,** accepts any Luer fitting needle. Supplied in pack of 25.

Capacity	1	2	5	10 ml	
Subdivided	0·01	0·2	0·5	1 ml	
Four packs	**72/–**	**43/–**	**68/–**	**88/–**	c
Pack	**19/–**	**11/6**	**18/–**	**23/6**	

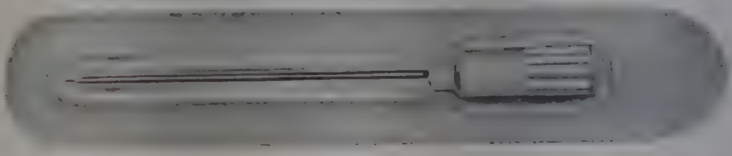


SY-430

SY-432

SYRINGE NEEDLES, disposable, stainless steel with polystyrene Luer connection, radiation sterilised. Each needle separately packed with plastics protecting sheath in a sealed polythene envelope. Supplied in pack of 25.

Size No.	Hypo 20	15	1	Serum II	
Gauge	25	23	21	19	
Length	16	25	38	51 mm	
Four packs	**29/–**	**31/–**	**29/–**	**42/–**	c
Pack	**8/3**	**8/6**	**8/3**	**11/3**	

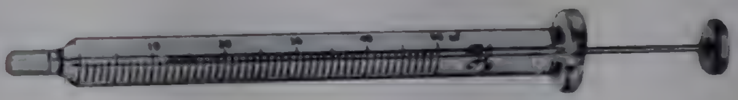


SY-432

MICRO SYRINGES

***SY-500**

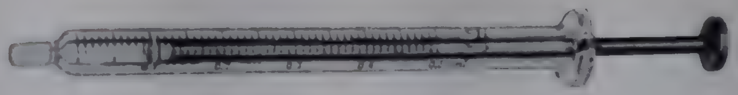
SYRINGE, 50 µl, glass and stainless steel, for liquids. With heat resistant glass barrel having indelibly marked calibrations with subdivisions to 1 mm³ and stainless steel plunger. **Without needle,** accepts any Luer fitting needle ... ... Each **£5. 2. 6.** *f*



SY-500

***SY-520**

SYRINGE, 500 µl, glass and PTFE, for gases. With heat resistant glass barrel having indelibly marked calibrations with subdivisions to 10 mm³ and PTFE piston. **Without needle,** accepts any Luer fitting needle. Each **£8. 5. 0.** *f*

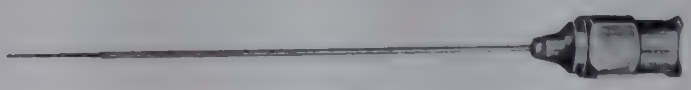


SY-520

***SY-550**

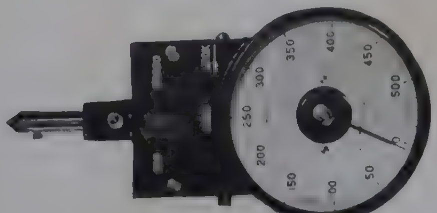
SYRINGE NEEDLE, stainless steel with nickel plated brass Luer connection. Intended originally for gas chromatography the needle is sheathed with a 40 × 0·71 mm sheath from which it projects 10 × 0·36 mm. The tip is 0·15 mm bore and has a 17° axial point to minimise damage to septa ... ... Each **£0. 13. 0.** *f*

SYRINGES, Agla pipette **SYRINGE SAFETY PIPETTES**	see PIPETTES
SYRINGE NEEDLES, long	see CL-945 in List No. sequence.
SYRINGE, gas sampling	see GF-415 in List No. sequence.



SY-550

All items on this page normally available from stock.



TB-020

Hand type tachometer for use with centrifuges see CF-480 in List No. sequence.

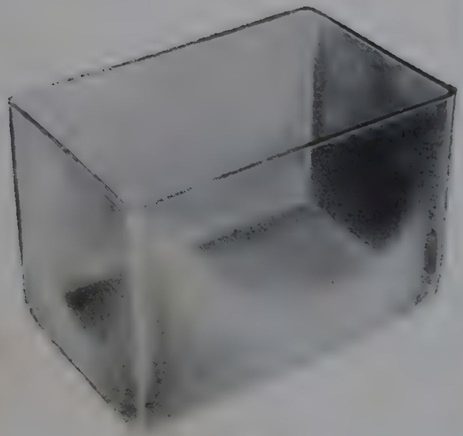
Tally counters see COUNTERS in List No. sequence.

Stroboscopes see SV-800 et seq. in List No. sequence.

TB-020

TACHOMETER, for measuring speed of rotation in either direction. The scale is graduated 0–500 rev/min, and a ×10, ×100 range switch enables readings to be made up to 50,000 rev/min, complete with pointer lock enabling readings to be taken after withdrawal, male and female hard rubber centres, 7·5 cm extension piece, and disk attachment for surface speed measurement. In protective case ... ... Each **£18. 18. 0.** *m*

TANKS



TB-550

TB-600

TB-650

TANKS, aquaria	see	BIOLOGY
, glass	see	Pneumatic troughs under GAS COLLECTING
, polythene	see	Waste bins under WASTE DISPOSAL
, perspex	see	JARS
TAPES, adhesive	see	PLASTICS SUNDRIES
, heating	see	HEATING TAPES
, labelling	see	LABELS
, measuring	see	RULES

***TB-550**

TANKS, stout blown glass, rectangular.

Capacity (approx.)	1·75	3	5·5 litres	
Height	12·5	15	17·5 cm	
Length	17·5	20	25 cm	
Width	12·5	15	17·5 cm	
Dozen	**260/–**	**320/–**	**410/–**	c
Each	**23/6**	**29/–**	**37/–**	
Capacity (approx.)	9	14	25 litres	
Height	20	22·5	27·5 cm	
Length	30	35	40 cm	
Width	20	22·5	27·5 cm	
Dozen	**680/–**	**840/–**	—	c
Each	**62/–**	**76/–**	**130/–**	

TB-560

TANKS, stout pressed glass, rectangular.

Capacity (approx.)	21	26	35	48 litres	
Height	30	28	30	30 cm	
Length	30	40	45	60 cm	
Width	30	28	30	30 cm	
Each	**160/–**	**175/–**	**215/–**	**270/–**	c

TB-600

TANKS, *Pyrex brand* glass, circular, mould blown, with ground edge. For storage of specimens and also suitable for use as thermostat baths.

Capacity (approx.)	2	8	12	30 litres	
Diameter	15	20	25	30 cm	
Height	15	30	30	45 cm	
Wall	2–4	2–4	3–6	3–6 mm	
Each	**19/–**	**34/6**	**79/6**	**117/–**	*m*

TB-650

TANKS, rigid polythene, rectangular, for storage of chemicals within the limits of the chemical resistance of polythene.

Capacity (approx.)	55	55	145 litres	
Height	30	34	48 cm	
Length	60	46	65 cm	
Width	46	34	50 cm	
Each	**100/–**	**100/–**	**165/–**	*m*

Other containers are listed under BV-430 to BV-470 and WD-425.

All items on this page normally available from stock.

TEMPERATURE MEASUREMENT

For general guidance we list briefly below details of apparatus available for temperature measurement and calibration purposes. Full information will be found under the List Nos. indicated.

FURNACES	List No. FS-400, FS-470 et seq.
OIL BATH, calibrating	List No. OD-050
PENCILS, Thermochrom, temperature indicating	List No. PC-980 et seq.
PYROMETER INDICATORS AND CONTROLLERS	List No. PX-020 et seq.
THERMOMETERS	List No. TJ-050 et seq.
THERMOSTAT BATHS, heated	List No. VS-615, VS-670
THERMOSTAT BATHS, cooled	List No. WF-720

TEST PAPERS

TEST PAPERS, indicator, pack of 12 books each of 20 leaves measuring 65×10 mm.

List No.	Indicator	pH range	Colour change	12 packs	Pack	
TE-013	Congo red	3·0–5·0	Blue-red	36/–	4/6	m
TE-014	Litmus, red	5·0–8·0	Red-blue	36/–	4/6	m
TE-015	Litmus, blue	5·0–8·0	Blue-red	36/–	4/6	m
TE-016	Litmus, neutral	7·0–5·0 7·0–8·0	Mauve-red Mauve-blue	36/–	4/6	m

TEST PAPERS, pH narrow range, pack of 12 books each of 20 leaves measuring 65×10 mm, with colour chart on book cover showing colour changes at intervals of 0·5 pH for TE-035 and 0·3 pH for TE-036 to TE-039.

List No.	pH range	12 packs	Pack	
TE-035	1·0– 3·5	56/–	6/–	m
TE-036	3·6– 5·1	56/–	6/–	m
TE-037	5·2– 6·7	56/–	6/–	m
TE-038	6·8– 8·3	56/–	6/–	m
TE-039	8·4–10	56/–	6/–	m

TE-041

TEST PAPERS, pH wide range, 1·0 to 11·0 pack of 12 books each of 20 leaves measuring 65×10 mm. With colour chart on book cover showing colour changes in steps of 1·0 pH.

12 packs **£2. 16. 0.** Pack **£0. 6. 0.** *m*

OTHER APPARATUS FOR pH MEASUREMENT

Lovibond nessleriser	see **CS-502** et seq
Lovibond comparator	see **CT-200** et seq
pH meters	see **EJ-300** et seq
BDH soil testing outfit	see **SH-140**

TEST PAPERS, miscellaneous, pack of 12 books each of 20 leaves measuring 67×12·5 mm.

List No.	Indicator	Application	Colour change	12 packs	Pack	
TE-050	Cobalt chloride	Moisture	Pink-blue	36/–	4/6	m
TE-051	Lead acetate	Hydrogen sulphide	White-black	36/–	4/6	m
TE-053	Starch-pot. iodide	Oxidising agents	White-blue	36/–	4/6	m
TE-054	Turmeric	Ammonia and borates	Yellow-brown	36/–	4/6	m

TEST PAPERS, *Whatman–BDH,* plastics reel dispensers with colour reference chart on side, containing 5 metres×10 mm paper protected from contamination, convenient and economical in use.

List No.	Code No.	Test	Pack of 10	Each	
TE-070	FR 1–14	Full range pH 1–14	**50/–**	**6/2**	d
		Narrow range			
TE-074	NR 1–5	pH 1–5	**45/–**	**5/10**	d
TE-075	NR 4–6	pH 4–6	**45/–**	**5/10**	d
TE-076	NR 6–8	pH 6–8	**45/–**	**5/10**	d
TE-077	NR 8–10	pH 8–10	**45/–**	**5/10**	d
TE-078	NR 10–12	pH 10–12	**45/–**	**5/10**	d
TE-079	NR 12–14	pH 12–14	**45/–**	**5/10**	d
TE-085	LR	Litmus, red	**45/–**	**5/10**	d
TE-086	LB	Litmus, blue	**45/–**	**5/10**	d
TE-090	PP	Phenolphthalein	**45/–**	**5/10**	d
TE-092	CR	Congo red	**45/–**	**5/10**	d
TE-100	LA	Lead acetate	**50/–**	**6/2**	d
TE-105	SI	Starch–Iodide	**50/–**	**6/2**	d

All items on this page normally available from stock.

TEST TUBES

SODA-LIME GLASS

TF-100

TEST TUBES, soda-lime glass, normal wall, with rims. (BS 3218 light wall thickness).

Dimensions mm	Standard pack qty.	Dozen packs	Standard pack	
50 × 6	144	**118/–**	**10/9**	c
75 × 10	144	**120/–**	**11/–**	c
75 × 12	144	**120/–**	**11/–**	c
100 × 12	72	**76/–**	**7/6**	c
100 × 16	72	**90/–**	**8/6**	c
125 × 12	72	**92/–**	**8/9**	c
125 × 16	72	**106/–**	**9/9**	c
150 × 16	72	**130/–**	**11/9**	c
150 × 19	72	**165/–**	**15/–**	c
150 × 25	72	**240/–**	**22/–**	c
175 × 30	72	**600/–**	**54/–**	c

TF-104

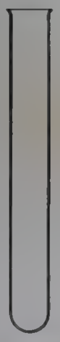
TEST TUBES, soda-lime glass, heavy wall, rimless, bacteriological grade. The 75 × 12 mm tube is suitable for the Kahn test.

Dimensions mm	Standard pack qty.	Dozen packs	Standard pack	
75 × 10	144	**150/–**	**13/6**	c
75 × 12	144	**150/–**	**13/6**	c
100 × 12	72	**98/–**	**9/–**	c
100 × 16	72	**110/–**	**10/–**	c
125 × 12	72	**114/–**	**10/3**	c
125 × 16	72	**140/–**	**12/9**	c
150 × 16	72	**160/–**	**14/6**	c
150 × 19	72	**195/–**	**17/6**	c
150 × 25	72	**330/–**	**30/–**	c
175 × 30	72	**640/–**	**58/–**	c

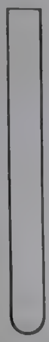
TF-110

TEST TUBES, soda-lime glass, with side arm.

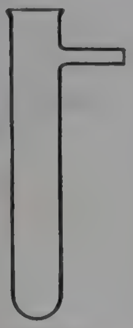
Length	125	150 mm	
Diameter	15	20 mm	
Dozen	**17/6**	**26/6**	a
Each	**3/1**	**3/9**	



TF-100
TF-126



TF-104
TF-128



TF-110

NEUTRAL RESISTANCE GLASS

TF-122

TEST TUBES, Durham fermentation, to BS 625, neutral resistance glass, rimless.

Length	30	35	50 mm	
Diameter	6	8	7·5 mm	
Std. pack. qty.	288	288	144	
Std. pack	**36/–**	**37/–**	**18/6**	c

TF-123

TEST TUBE, Dreyer, to BS 625, neutral resistance glass, with rim. Dimensions 60 × 7 mm in packs of 144.
Pack **£2. 16. 0.** c

TF-126

TEST TUBES, neutral resistance glass, normal wall, with rims. Coefficient of expansion $5 \cdot 1 \times 10^{-6}$.

Prices and dimensions as TF-128 in table below.

TF-128

TEST TUBES, neutral resistance glass, medium wall, rimless, bacteriological grade, nominal wall thickness 0·75 mm. Coefficient of expansion $5 \cdot 1 \times 10^{-6}$.

Dimensions mm	Standard pack qty.	Dozen packs	Standard pack	
75 × 10	144	**215/–**	**19/6**	c
100 × 12	72	**150/–**	**13/6**	c
100 × 16	72	**175/–**	**16/–**	c
125 × 16	72	**200/–**	**18/–**	c
150 × 16	72	**240/–**	**22/–**	c
150 × 19	72	**330/–**	**30/–**	c
150 × 25	72	**420/–**	**38/–**	c

Test Tubes for special purposes are shown elsewhere in the catalogue as indicated below. Full details are given in List No. sequence.

	List No.
Colorimetry	
Test Tube, uniform diameters	CS-270
Test Tube, Lovibond	CT-250
Culture Apparatus	
Test Tube, tissue culture	CX-460
Test Tube, Leighton	CX-470, CX-472
Dairy Products	
Test Tube, methylene blue test	DB-220
Test Tube, resazurin test	DE-250
Test Tube, solubility index	DE-600
Petroleum and Allied Products	
Test Tube, oil container IP 19	PE-504
Test Tube, drop point IP 31	PE-822
Test Tube, drop point ASTM D 566–IP 132	PE-830

All items on this page normally available from stock.

TEST TUBES

BOROSILICATE GLASS

TF-180

TEST TUBES, *Pyrex brand* **glass,** light wall, with rims.

TF-182

TEST TUBES, *Pyrex brand* **glass,** light wall, rimless.

TF-184

TEST TUBES, *Pyrex brand* **glass,** medium wall, with rims.

TF-186

TEST TUBES, *Pyrex brand* **glass,** medium wall, rimless.

List Nos.		TF-180 and TF-182		TF-184 and TF-186		
Dimensions, mm	Std. pack qty.	Std. pack	Dozen tubes	Std. pack	Dozen tubes	
75×10	144	22/-	3/5	36/-	4/6	d
75×12	144	29/-	4/-	40/-	4/10	d
100×12	144	29/-	4/-	47/-	5/4	d
100×16	144	47/-	5/4	—	—	d
125×16	144	52/-	5/8	76/-	7/6	d
150×12	144	38/-	4/7	—	—	d
150×16	144	56/-	6/-	83/-	8/-	d
150×19	144	60/-	6/4	93/-	8/9	d
150×25	144	78/-	7/8	126/-	11/8	d
180×18	144	83/-	8/-	—	—	d
200×25	72	61/-	11/3	—	—	d
200×32 TF-180/4	72	154/-	28/6	216/-	40/-	d
200×32 TF-182/6	72	144/-	26/8	186/-	34/6	d
200×38 TF-180/4	36	88/-	32/8	106/-	39/6	d
200×38 TF-182/6	36	82/-	30/5	103/-	38/2	d

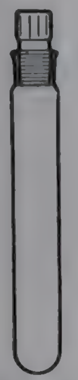
TF-280

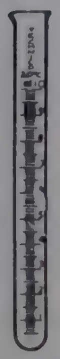
TEST TUBES, borosilicate glass, with ground neck to take glass stoppers SU-520 or plastics stoppers SU-700.

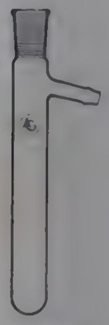
Length	100	125	150 mm	
Diameter	12	16	22 mm	
Neck size	10/13	14/15	19/17	
Dozen	23/-	27/6	34/-	a
Each	3/6	3/10	4/4	

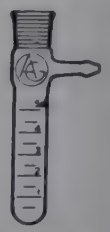
SU-520	Stoppers, hollow blown glass, for tubes TF-280. For prices see entry in List No. sequence.
SU-700	Stoppers, plastics, with hexagonal dustproof head, for tubes TF-280. For prices see entry in List No. sequence.

STOPPERED TEST TUBES see also QUICKFIT APPARATUS


TF-280 with SU-520


TF-350


TF-410


TF-420

TF-350

TEST TUBES, (AG), borosilicate glass, graduated. Capacity 10 cm³ subdivided 0·1 cm³.

Dozen **£3. 10. 0.** Each **£0. 7. 0.** *a*

TF-410

TEST TUBE, (AG), borosilicate glass, with 19/26 socket and sidearm suitable for use with Hirsch funnel FP-445. Length 150 mm, diameter 20 mm.

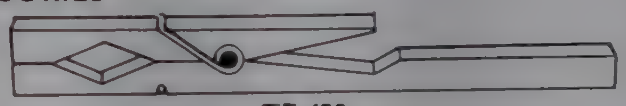
Dozen **£5. 4. 0.** Each **£0. 9. 6.** *a*

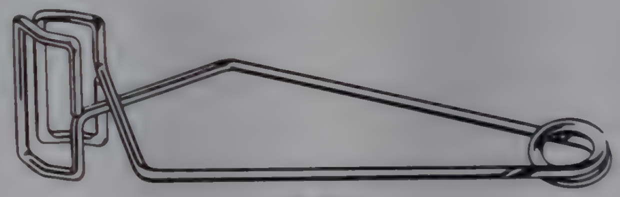
TF-420

TEST TUBE, (AG), borosilicate glass, graduated 0 to 5 cm³ in 0·5 cm³, with 14/15 socket and sidearm, as used in (AG) small scale preparative set DT-750.

Dozen **£2. 19. 0.** Each **£0. 6. 2.** *a*

ACCESSORIES


TF-450


TF-455

TF-450

TEST TUBE HOLDER, hardwood, with wire spring, in pack of 12.

12 packs **£6. 10. 0.** Pack **£0. 11. 9.** c

TF-455

TEST TUBE HOLDER, spring steel, nickel plated, in pack of 12.

12 packs **£7. 5. 0.** Pack **£0. 13. 3.** c

BU-550 to BU-562
TEST TUBE BRUSHES
SM-822 to SM-885
TEST TUBE STANDS
TS-250
TEST TUBE TONGS

For details see entries in List No. sequence.

All items on this page normally available from stock.

THERMOMETERS

Foreword

A selection of thermometers is listed in this section covering most requirements for academic and industrial laboratories. The section contains British Standard thermometers with and without NPL certificates, general purpose thermometers and a selection of dial, industrial and recording thermometers. Special thermometers are included such as used in calorimetry, melting point determinations and petroleum testing to IP specifications.

GENERAL INFORMATION

Mercury-in-glass thermometers are still the most convenient devices for measuring temperature quickly and with reasonable accuracy. Alcohol, pentane and toluene are used to fill low temperature thermometers but such thermometers do not have the same accuracy as mercury thermometers.

ENGRAVED STEM THERMOMETERS

These comprise selected glass tubes, of very fine and uniform bores, sealed to bulbs, the scales being engraved directly onto the stems.

ENCLOSED OPAL GLASS SCALE THERMOMETERS

These thermometers comprise capillary tubes of small outside diameters, sealed to bulbs and the stems so produced anchored to scales made of opal glass. The capillaries and scales are both enclosed in outer protective glass tubes.

IMMERSION DEPTH

Most standard thermometers are calibrated to give a correct reading of temperature when the liquid in the thermometer is completely immersed in the medium being tested. In theory that part of the stem above the fluid level in the thermometer should not be immersed, but in practice it is necessary to have the thermometer fluid level slightly above the sample level in order to read the thermometer. Partial immersion thermometers are calibrated to read correctly when immersed up to a definite point indicated on the stem. In theory, the temperature of vapour surrounding the emergent portion should be the same as during standardisation and calibration, but this condition is difficult to obtain. Thus, total immersion thermometers are considered more accurate although if insufficiently immersed these thermometers will read low for temperatures above the surroundings and vice-versa. **All standard thermometers are calibrated for total immersion unless otherwise stated.**

NATIONAL PHYSICAL LABORATORY CERTIFICATES

The National Physical Laboratory accepts thermometers, which are manufactured to conform with the appropriate British Standard or other specifications, for testing and retesting. Such thermometers are provided with certificates which give corrections at 5 or more points according to the type and accuracy of the thermometer. An NPL certificate is a verification of the accuracy of a thermometer and should not be regarded as a guarantee of correct functioning. Thermometers should be re-tested at intervals not exceeding five years or more frequently if determination of the zero or other suitable fixed point indicates that a re-test is required. A change of one or two divisions does not necessarily imply the necessity of at complee re-test, as this may be due to a normal change in the volume of the bulb. Such an error may be allowed for by applying a suitable correction factor equal to the fixed point change throughout the scale.

CARE OF LIQUID-IN-GLASS THERMOMETERS

Liquid-in-glass thermometers are liable to be put out of order during transit or when otherwise subjected to undue vibration. The following is a summary of the defects which are likely to occur and the best remedial procedures.

Gas trapped in bulb. The bubble or bubbles should first be tapped into the top of the bulb which is then cooled by immersion in a suitably cold medium, until all the mercury is sufficiently cooled to enable the trapped gas to be forced above the mercury. It may be necessary to heat and cool the thermometer two or three times to do this. Should a thermometer need cooling to very low temperatures for this purpose (see RJ-550 Freezer Aerosol in List No. sequence), it should not be shaken or vibrated while the mercury is frozen solid.

Gas trapped in contraction chamber. The mercury can be cooled as described above until the gas is above the mercury.

Divided column. The parts may be rejoined by cooling as described above.

Detached mercury at the top of contraction chamber. It is necessary to cool the bulb until mercury comes down into the contraction chamber. The side of the stem should be gently tapped until the detached mercury forms a globule on the wall of the contraction chamber. By gently heating the bulb this mercury can be rejoined to the main column.

Detached mercury in expansion chamber. Tap the top of the stem until the detached mercury collects on the top of the capillary. Heat the thermometer bulb, taking great care if the thermometer is a high temprature one. As the expanding mercury forces gas into the expansion chamber continue to tap the stem in order to keep the detached mercury on top of the capillary.

Mercury in U-tube of Beckmann thermometer. For safety in transit, the U-shaped capillary, at the top of Beckmann thermometers, is frequently almost filled with mercury. To rejoin this mercury to the main column so that zero can be set at the required point, the top of stem just below the metal cap is gently warmed until the mercury in the U-capillary expands thereby driving some into the bore. All the mercury should then siphon into the bulb and fill the bore. The trapped gas can then be cleared by the cooling method already described.

STORAGE OF THERMOMETERS

Those thermometers having ranges entirely below ambient temperature should if possible, be stored vertically with the bulbs downwards. Spirit thermometers should always be stored away from direct sunlight. Thermometers after usage should be allowed to reach air temperature before storage.

Apparatus for calibration of thermometers and pyrometers see list under TEMPERATURE MEASUREMENT.

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Incubator	see	IH-110
Melting point	see	MF-562
Oven	see	HJ-108, MV-476 MV-616, OV-178
Soil	see	SH-210
Standard joint	see	*Quickfit* apparatus

Details and prices will be found in List No. sequence.

BRITISH STANDARDS FOR THERMOMETERS

BS 593	Laboratory thermometers
BS 619	Incubator, water bath and oven thermometers for laboratory use
BS 691	Clinical maximum thermometers
BS 791	Bomb calorimeter thermometers
BS 1365	Short-range short-stem thermometers
BS 1704	General purpose thermometers
BS 2840	General purpose maximum and minimum thermometers (Six's pattern)

TEMPERATURE CONVERSION TABLE

(Sauveut's Arrangement)

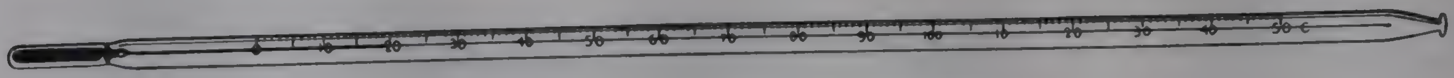
The middle column is the known temperature in °C or °F. The equivalent temperature on the other scale is to right or left of this figure depending on the conversion desired. For example: 100°C is 212°F and 100°F is 37·8°C.

—70 to —1			0 to 34			35 to 69			70 to 89			90 to 1000			1100 to 3000		
C		F	C		F	C		F	C		F	C		F	C		F
—112	**—170**	—274	—17·8	**0**	32	1·7	**35**	95·0	21·1	**70**	158	32·2	**90**	194	593	**1100**	2012
—107	**—160**	—256	—17·2	**1**	33·8	2·2	**36**	96·8	21·7	**71**	159·8	32·8	**91**	195·8	649	**1200**	2192
—101·2	**—150**	—238	—16·7	**2**	35·6	2·8	**37**	98·6	22·2	**72**	161·6	33·3	**92**	197·6	704	**1300**	2372
—96	**—140**	—220	—16·1	**3**	37·4	3·3	**38**	100·4	22·8	**73**	163·4	33·9	**93**	199·4	760	**1400**	2552
—90	**—130**	—202	—15·6	**4**	39·2	3·9	**39**	102·2	23·3	**74**	165·2	34·4	**94**	201·2	816	**1500**	2732
—84	**—120**	—184	—15·0	**5**	41·0	4·4	**40**	104·0	23·9	**75**	167·0	35·0	**95**	203·0	871	**1600**	2912
—79	**—110**	—166	—14·4	**6**	42·8	5·0	**41**	105·8	24·4	**76**	168·8	35·6	**96**	204·8	927	**1700**	3092
—73·4	**—100**	—148	—13·9	**7**	44·6	5·6	**42**	107·6	25·0	**77**	170·6	36·1	**97**	206·6	982	**1800**	3272
—68	**—90**	—130	—13·3	**8**	46·4	6·1	**43**	109·4	25·6	**78**	172·4	36·7	**98**	208·4	1038	**1900**	3452
—62	**—80**	—112	—12·8	**9**	48·2	6·7	**44**	111·2	26·1	**79**	174·2	37·2	**99**	210·2	1093	**2000**	3632
—57	**—70**	—94	—12·2	**10**	50·0	7·2	**45**	113·0	26·7	**80**	176·0	37·8	**100**	212	1149	**2100**	3812
—51	**—60**	—76	—11·7	**11**	51·8	7·8	**46**	114·8	27·2	**81**	177·8	93·3	**200**	392	1204	**2200**	3992
—45·6	**—50**	—58	—11·1	**12**	53·6	8·3	**47**	116·6	27·8	**82**	179·6	149	**300**	572	1260	**2300**	4172
—40·0	**—40**	—40	—10·6	**13**	55·4	8·9	**48**	118·4	28·3	**83**	181·4	204	**400**	752	1316	**2400**	4352
—34·4	**—30**	—22	—10·0	**14**	57·2	9·4	**49**	120·2	28·9	**84**	183·2	260	**500**	932	1371	**2500**	4532
—28·9	**—20**	—4	—9·4	**15**	59·0	10·0	**50**	122·0	29·4	**85**	185	316	**600**	1112	1427	**2600**	4712
—28·3	**—19**	—2·2	—8·9	**16**	60·8	10·6	**51**	123·8	30·0	**86**	186·8	371	**700**	1292	1482	**2700**	4892
—27·8	**—18**	—0·4	—8·3	**17**	62·6	11·1	**52**	125·6	30·6	**87**	188·6	427	**800**	1472	1538	**2800**	5072
—27·2	**—17**	1·4	—7·8	**18**	64·4	11·7	**53**	127·4	31·1	**88**	190·4	482	**900**	1652	1593	**2900**	5252
—26·7	**—16**	3·2	—7·2	**19**	66·2	12·2	**54**	129·2	31·7	**89**	192·2	538	**1000**	1832	1649	**3000**	5432
—26·1	**—15**	5·0	—6·7	**20**	68·0	12·8	**55**	131·0									
—25·6	**—14**	6·8	—6·1	**21**	69·8	13·3	**56**	132·8									
—25·0	**—13**	8·6	—5·6	**22**	71·6	13·9	**57**	134·6									
—24·4	**—12**	10·4	—5·0	**23**	73·4	14·4	**58**	136·4									
—23·9	**—11**	12·2	—4·4	**24**	75·2	15·0	**59**	138·2									
—23·3	**—10**	14·0	—3·9	**25**	77·0	15·6	**60**	140·0									
—22·8	**—9**	15·8	—3·3	**26**	78·8	16·1	**61**	141·8									
—22·2	**—8**	17·6	—2·8	**27**	80·6	16·7	**62**	143·6									
—21·7	**—7**	19·4	—2·2	**28**	82·4	17·2	**63**	145·4									
—21·1	**—6**	21·2	—1·7	**29**	84·2	17·8	**64**	147·2									
—20·6	**—5**	23·0	—1·1	**30**	86·0	18·3	**65**	149·8									
—20·0	**—4**	24·8	—0·6	**31**	87·8	18·9	**66**	150·8									
—19·4	**—3**	26·6	0	**32**	89·6	19·4	**67**	152·6									
—18·9	**—2**	28·4	0·6	**33**	97·4	20·0	**68**	154·4									
—18·3	**—1**	30·2	1·1	**34**	93·2	20·6	**69**	156·2									

INTERPOLATION FACTORS

C		F	C		F	C		F
0·56	**1**	1·8	4·44	**8**	14·4	33·3	**60**	108
1·11	**2**	3·6	5·00	**9**	16·2	38·9	**70**	126
1·67	**3**	5·4	5·56	**10**	18·0	44·4	**80**	144
2·22	**4**	7·2	11·1	**20**	36·0	50·0	**90**	162
2·78	**5**	9·0	16·7	**30**	54·0	55·6	**100**	180
3·33	**6**	10·8	22·2	**40**	72·0			
3·89	**7**	12·6	27·8	**50**	90·0			

GENERAL PURPOSE LABORATORY THERMOMETERS



Typical general purpose thermometer

TJ-050

THERMOMETERS, Centigrade scales, solid stem mercury-in-glass, gas filled. Overall length about 300 mm, stem diameter 5–7 mm. 75 mm immersion.

No.	Scale span °C	Subdiv. °C	Dozen	Each	
1	0 to 60	1·0	**118/–**	**10/9**	c
2	–10 to 110	1·0	**96/–**	**9/–**	c
3	0 to 200	1·0	**118/–**	**10/9**	c
4	0 to 250	1·0	**130/–**	**11/9**	c
5	0 to 360	2·0	**140/–**	**12/9**	c
6	0 to 400	2·0	**155/–**	**14/–**	c

TJ-052

THERMOMETERS, as TJ-050 but **Fahrenheit scales.**

No.	Scale span °F	Subdiv. °F	Dozen	Each	
1	0 to 110	1·0	**118/–**	**10/9**	c
2	0 to 240	1·0	**104/–**	**9/6**	c
3	0 to 400	2·0	**118/–**	**10/9**	c
4	0 to 600	5·0	**140/–**	**12/9**	c

TJ-056

THERMOMETER, short stem. Similar to TJ-050 but 150 mm long, scale span 0–150°C in 2°C. Specially suitable for semi-micro use as with educational preparative set DT-750 ... Dozen **£6. 5. 0.** Each **£0. 11. 3.** c

TJ-060

THERMOMETERS, Centigrade scales, solid stem mercury-in-glass, gas filled, with safety chamber. Overall length about 400 mm, diameter 5–7 mm. The graduations commence about 10 cm above the mercury bulb.

No.	Scale span °C	Subdiv. °C	Dozen	Each	
1	0 to 105	0·5	**200/–**	**18/–**	c
2	0 to 150	1·0	**200/–**	**18/–**	c
3	0 to 250	1·0	**210/–**	**19/–**	c
4	0 to 360	2·0	**225/–**	**20/6**	c

TJ-070

THERMOMETERS, Standard A, Centigrade scales. A series of high quality accurate thermometers, finely divided on solid stem, gas filled, with safety chamber, calibrated at total immersion.

No.	Scale span °C	Subdiv. °C	Length mm	Dozen	Each	
1	–5 to 50	0·2	350	**225/–**	**20/6**	c
2	–5 to 50	0·1	400	**250/–**	**23/–**	c
3	–5 to 105	0·2	350	**265/–**	**24/–**	c
4	–5 to 105	0·1	450	**370/–**	**34/–**	c

ADJUSTABLE IMMERSION THERMOMETERS. Suitable for standard joint assemblies and many other purposes see TJ-320 in List No. sequence.

All items on this page normally available from stock.

GENERAL PURPOSE LABORATORY THERMOMETERS TO BS 1704

Solid stem, gas filled, mercury-in-glass thermometers with safety chambers, in four series: Centrigrade scales for total and partial immersion and Fahrenheit scales for total and partial immersion. The first of each total immersion series is spirit filled.

TJ-100

THERMOMETERS, to BS 1704, Centigrade scales, for total immersion. Stem diameter 6 mm.

Schedule mark	Scale span °C	Sub-div. °C	Length mm	Dozen	Each	
B.GP.35C/TOT	−120 to +35	1·0	350	**290/–**	**26/6**	c
GP.50C/TOT	−35 to +50	0·5	300	**210/–**	**19/–**	c
GP.105C/1·0/TOT	−5 to +105	1·0	300	**160/–**	**14/6**	c
GP.105C/0·5/TOT	−5 to +105	0·5	300	**140/–**	**12/9**	c
GP.150C/TOT	−5 to +150	1·0	300	**160/–**	**14/6**	c
GP.250C/TOT	−5 to +250	1·0	300	**180/–**	**16/6**	c
GP.360C/TOT	−5 to +360	1·0	350	**250/–**	**23/–**	c
GP.400C/TOT	−10 to +400	2·0	300	**220/–**	**20/–**	c
GP.510C/TOT	−10 to +510	2·0	380	**530/–**	**48/–**	c

TJ-104

THERMOMETERS, to BS 1704 Fahrenheit scales, for total immersion. Stem diameter 6 mm.

Schedule mark	Scale span °F	Sub-div. °F	Length mm	Dozen	Each	
B.GP.96F/TOT	−180 to + 96	2·0	350	**290/–**	**26/6**	c
GP.120F/TOT	−35 to +120	1·0	300	**225/–**	**20/6**	c
GP.220F/TOT	30 to 220	1·0	300	**140/–**	**12/9**	c
GP.300F/TOT	30 to 300	1·0	300	**175/–**	**16/–**	c
GP.500F/TOT	28 to 500	2·0	300	**180/–**	**16/6**	c
GP.650F/TOT	26 to 650	2·0	350	**250/–**	**23/–**	c
GP.750F/TOT	20 to 750	5·0	300	**210/–**	**19/–**	c
GP.950F/TOT	20 to 950	5·0	380	**590/–**	**53/–**	c

TJ-102

THERMOMETERS, to BS 1704, Centigrade scales, for partial (100 mm) immersion. Stem diameter 6 mm.

Schedule mark	Scale span °C	Sub-div. °C	Length mm	Dozen	Each	
GP.50C/100	−35 to +50	0·5	350	**215/–**	**19/6**	c
GP.105C/1·0/100	−5 to +105	1·0	300	**160/–**	**14/6**	c
GP.105C/0·5/100	−5 to +105	0·5	300	**130/–**	**11/9**	c
GP.150C/100	−5 to +150	1·0	300	**170/–**	**15/6**	c
GP.250C/100	−5 to +250	1·0	300	**180/–**	**16/6**	c
GP.360C/100	−5 to +360	1·0	350	**250/–**	**23/–**	c
GP.400C/100	−10 to +400	2·0	300	**225/–**	**20/6**	c
GP.510C/100	−10 to +510	2·0	380	**530/–**	**48/–**	c

TJ-106

THERMOMETERS, to BS 1704, Fahrenheit scales, for partial (100 mm) immersion. Stem diameter 6 mm.

Schedule mark	Scale span °F	Sub-div. °F	Length mm	Dozen	Each	
GP.120F/100	−35 to +120	1·0	300	**225/–**	**20/6**	c
GP.220F/100	30 to 220	1·0	300	**140/–**	**12/9**	c
GP.300F/100	30 to 300	1·0	300	**175/–**	**16/–**	c
GP.500F/100	28 to 500	2·0	300	**180/–**	**16/6**	c
GP.650F/100	26 to 650	2·0	350	**250/–**	**23/–**	c
GP.750F/100	20 to 750	2·0	300	**260/–**	**23/6**	c
GP.950F/100	20 to 950	5·0	380	**570/–**	**52/–**	c

All items on this page normally available from stock.

STANDARD LABORATORY THERMOMETERS TO BS 593

TJ-150

THERMOMETERS, to BS 593, Series A, Centigrade scales, for **total immersion.** With zero check scale −0·5 to +0·5°C where applicable. Overall length about 400 mm, stem diameter 5·5 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. °C	Dozen	Each	
A.20C/TOT	−20·5 to +20·5	0·1	**340/-**	**31/-**	c
A.40C/TOT	− 0·5 to +40·5	0·1	**350/-**	**32/-**	c
A.70C/TOT	39·5 to 70·5	0·1	**590/-**	**53/-**	c
A.100C/TOT	69·5 to 100·5	0·1	**700/-**	**64/-**	c
A.130C/TOT	99·5 to 130·5	0·1	**660/-**	**60/-**	c
A.160C/TOT	129·5 to 160·5	0·1	**720/-**	**66/-**	c

TJ-154

THERMOMETERS, to BS 593, Series A, Centigrade scales, for **partial (100 mm) immersion.** With zero check scale −0·5 to +0·5°C where applicable. Overall length about 400 mm, stem diameter 5·5 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. °C	Dozen	Each	
A.10C/100	−30·5 to +10·5	0·1	**350/-**	**32/-**	c
A.20C/100	−20·5 to +20·5	0·1	**330/-**	**30/-**	c
A.40C/100	− 0·5 to +40·5	0·1	**350/-**	**32/-**	c
A.70C/100	39·5 to 70·5	0·1	**580/-**	**52/-**	c
A.100C/100	69·5 to 100·5	0·1	**620/-**	**56/-**	c
A.130C/100	99·5 to 130·5	0·1	**660/-**	**60/-**	c
A.160C/100	129·5 to 160·5	0·1	**760/-**	**68/-**	c

TJ-170

THERMOMETERS, to BS 593, Series B, Centigrade scales, for **total immersion.** With zero check scale −1 to +1°C. Overall length about 400 mm, stem diameter 5·5 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. °C	Dozen	Each	
B.60C/TOT	−20 to +60	0·2	**290/-**	**26/6**	c
B.110C/TOT	50 to 110	0·2	**580/-**	**52/-**	c
B.160C/TOT	99 to 160	0·2	**680/-**	**62/-**	c
B.210C/TOT	150 to 210	0·2	**720/-**	**66/-**	c
B.260C/TOT	200 to 260	0·2	**620/-**	**56/-**	c

TJ-174

THERMOMETERS, to BS 593, Series B, Centigrade scales, for **partial (100 mm) immersion.** With zero check scale −1 to +1°C. Overall length about 400 mm, stem diameter 5·5 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. °C	Dozen	Each	
B.60C/100	−20 to +60	0·2	**300/-**	**27/-**	c
B.110C/100	50 to 110	0·2	**580/-**	**52/-**	c
B.160C/100	99 to 160	0·2	**640/-**	**58/-**	c
B,210C/100	150 to 120	0·2	**660/-**	**60/-**	c
B.260C/100	200 to 260	0·2	**680/-**	**62/-**	c

TJ-200

THERMOMETERS, to BS 593, Series C, Centigrade scales, for **total immersion.** Overall length about 200 mm, stem diameter 5·0 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. °C	Dozen	Each	
C.105C/TOT	−5 to +105	1·0	**225/-**	**20/6**	c
C.205C/TOT	95 to 205	1·0	**285/-**	**26/-**	c
C.305C/TOT	195 to 305	1·0	**340/-**	**31/-**	c
C.400C/TOT	295 to 400	1·0	**540/-**	**49/⅞**	c

TJ-208

THERMOMETERS to BS 593, Series C, Centigrade, scales, for **partial (100 mm) immersion.** Overall length about 250 mm, stem diameter 5·0 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. °C	Dozen	Each	
C.105C/100	−5 to +105	1·0	**235/-**	**21/6**	c
C.205C/100	95 to 205	1·0	**295/-**	**27/-**	c
C.305C/100	195 to 305	1·0	**295/-**	**27/-**	c
C.400C/100	295 to 400	1·0	**410/-**	**37/-**	c

TJ-230

THERMOMETERS, to BS 593, Series F, Centigrade scales, for **partial (100 mm) immersion.** Overall length about 385 mm, stem diameter 6·0 to 7·5 mm.

Schedule mark	ASTM No.	Scale span °C	Subdiv. °C	Dozen	Each	
F.50C/100	37C	−2 to +52	0·2	**330/-**	**30/-**	c
F.75C/100	38C	24 to 78	0·2	**360/-**	**33/-**	c
F.100C/100	39C	48 to 102	0·2	**360/-**	**33/-**	c
F.125C/100	40C	72 to 126	0·2	**370/-**	**34/-**	c
F.150C/100	41C	98 to 152	0·2	**370/-**	**34/-**	c
F.255C/100	42C	95 to 255	0·5	**410/-**	**37/-**	c

All items on this page normally available from stock.

STANDARD LABORATORY THERMOMETERS to BS 1365

Short range, short stem thermometers intended to meet the requirements for thermometers of the Anschutz and similar types. In two series covering the ranges of −10 to +360°C with scale span of about 60°C. Overall length about 220 to 240 mm, for total and partial immersion.

TJ-260

THERMOMETERS, to BS 1365, Series A1, Centigrade scales, for total immersion. Stem diameter 5 to 6 mm.

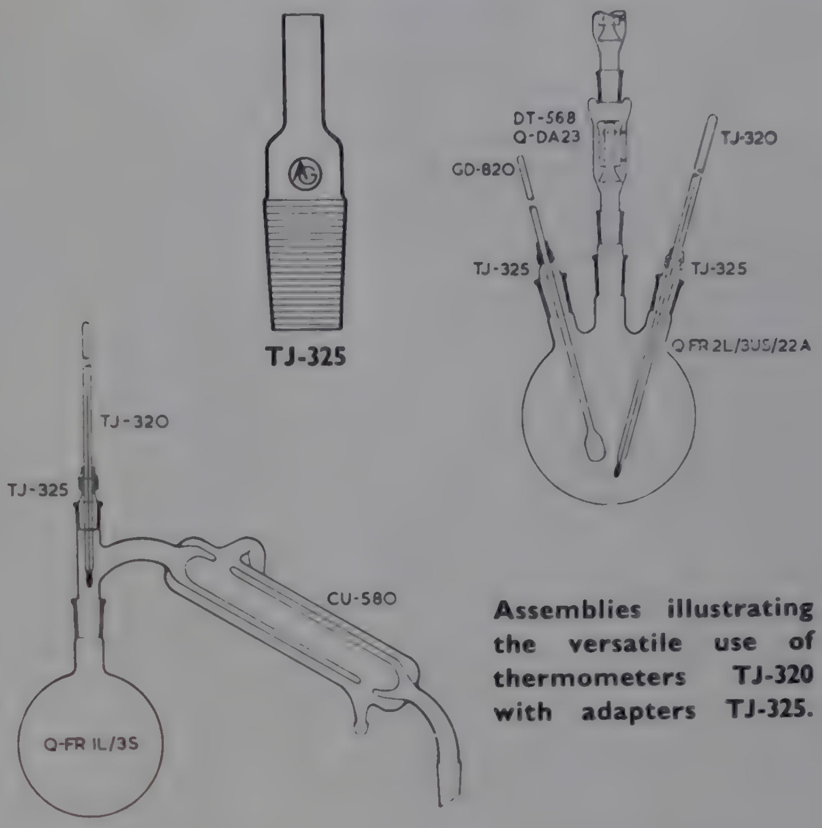
Schedule mark	Scale span °C	Subdiv. °C	Dozen	Each	
SA. 55C/TOT	−10 to +55	0·2	275/–	25/–	c
SA.105C/TOT	45 to 105	0·2	300/–	27/–	c
SA.155C/TOT	95 to 155	0·2	310/–	28/–	c
SA.205C/TOT	145 to 205	0·2	320/–	29/–	c
SA.255C/TOT	195 to 255	0·2	340/–	31/–	c
SA.305C/TOT	245 to 305	0·2	390/–	36/–	c
SA.360C/TOT	295 to 360	0·2	450/–	41/–	c

TJ-264

THERMOMETERS, to BS 1365, Series A2, Centigrade scales, for partial (80 mm) immersion. Stem diameter 5 to 6 mm.

Schedule mark	Scale span °C	Subdiv. °C	Dozen	Each	
SA. 55C/80	−10 to +55	0·2	275/–	25/–	c
SA.105C/80	45 to 105	0·2	300/–	27/–	c
SA.155C/80	95 to 155	0·2	310/–	28/–	c
SA.205C/80	145 to 205	0·2	320/–	29/–	c
SA.255C/80	195 to 255	0·2	340/–	31/–	c
SA.305C/80	245 to 305	0·2	390/–	36/–	c
SA.360C/80	295 to 360	0·2	460/–	42/–	c

ADJUSTABLE IMMERSION THERMOMETERS



Assemblies illustrating the versatile use of thermometers TJ-320 with adapters TJ-325.

TJ-320

THERMOMETERS, solid stem, adjustable immersion depth, Centigrade scales, for use in thermometer adapter TJ-325. These thermometers are calibrated for an average immersion of 120 mm and may be used at between 75 and 180 mm immersion depth. Small tolerance on diameter gives a clearance of less than 0·5 mm in the sleeve. Overall length 400 mm, with lowest graduation 220 mm from bulb, subdivided in 1°C. They are particularly useful for use with standard joint apparatus where the adapter can be placed in a stillhead or flask side neck.

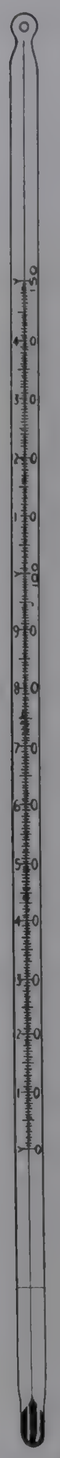
No.	Scale span °C	Dozen	Each	
1	−5 to +105	225/–	20/6	c
2	95 to 205	280/–	25/6	c
3	195 to 305	320/–	29/–	c

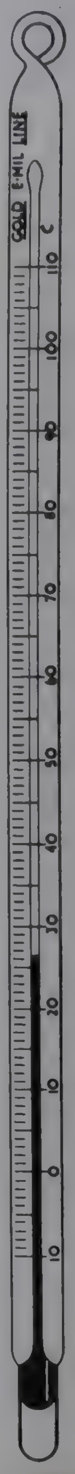
TJ-325

ADAPTERS, Ⓐ thermometer, for fitting thermometers (or gas entry tubes) into standard joint tubulures, allowing adjustment of immersion depth. Consisting of standard joint cone fitted with a short length of selected bore tubing of suitable size to take adjustable immersion thermometer TJ-320 or gas distribution tube GD-820. Will also accept other thermometers or tubes not exceeding 6·5 mm dia. The thermometer is held at the desired depth of immersion by means of a short length of rubber or plastics tubing.

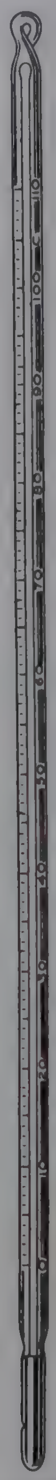
Cone	14/23	19/26	
Dozen	108/–	112/–	a
Each	10/–	10/3	

All items on this page normally available from stock.


TJ-340



TJ-400
TJ-404


TJ-440

MELTING POINT THERMOMETERS

TJ-340

THERMOMETERS, for melting point determinations, Centigrade scales, solid stem mercury-in-glass, gas filled with safety chamber adjusted for 30 mm immersion. Thermometer No. 4 is suitable for Rast's method. Overall length about 250 mm, stem dia. 6 mm. Subdivided in 0·5°C except No. 5 which is 300 mm and subdivided 1°C.

No.		1	2	3	4	5	
Scale span	from	0	140	290	140	0 °C	
	to	150	300	400	190	360 °C	
Dozen		**270/–**	**430/–**	**500/–**	**400/–**	**295/–**	c
Each		**24/6**	**39/–**	**45/–**	**36/–**	**27/–**	

TJ-380

THERMOMETER, water jacket, for use in gas analysis apparatus etc. Scale span 10 to 40°C subdivided in 0·2 C. Overall length 125 mm, stem diameter 5·5 mm.
Dozen **£5. 18. 0.** Each **£0. 10. 9.** c

TJ-400

THERMOMETERS, *E-MIL*, for **stirring purposes,** with reinforced bulb, **Centigrade scales.** Yellow enamel back, overall length 150 mm, calibrated at total immersion.

No.	Scale span °C	Subdiv. °C	Dozen	Each	
1	−10 to +110	1·0	**128/–**	**11/9**	*m*
2	0 to 50	1·0	**125/–**	**11/6**	*m*
3	0 to 150	1·0	**121/–**	**11/3**	*m*
4	0 to 250	1·0	**148/–**	**13/6**	*m*
5	0 to 360	2·0	**142/–**	**13/–**	*m*

TJ-404

THERMOMETERS, *E-MIL*, for **stirring purposes,** with reinforced bulb, as TJ-400 but 300 mm overall length.

No.	Scale span °C	Subdiv. °C	Dozen	Each	
1	−10 to +110	1·0	**137/–**	**12/6**	*m*
2	0 to 50	1·0	**139/–**	**12/9**	*m*
3	0 to 150	1·0	**131/–**	**12/–**	*m*
4	0 to 250	1·0	**157/–**	**14/3**	*m*
5	0 to 360	2·0	**161/–**	**14/9**	*m*

THERMOMETERS, red reflector type, solid stem, lens front mercury-in-glass, with red glass strip in stem. The mercury forms a mirror in which is seen a bright red image of the strip. These thermometers can be read more easily and the reading can be seen from a greater distance than with the ordinary mercury pattern and at the same time are free from the disadvantages of spirit filled thermometers.

TJ-440

THERMOMETERS, red reflector type, Centigrade scales, solid stem, lens front. Overall length about 300 mm.

No.	1	2	3	
Scale span	0 to 110	0 to 200	0 to 360 °C	
Subdiv.	1·0	1·0	2·0 °C	
Dozen	**225/–**	**245/–**	**295/–**	c
Each	**20/6**	**22/6**	**27/–**	

TJ-442

THERMOMETERS, red reflector type, Fahrenheit scales, solid stems, lens front. Overall length about 300 mm. Scale span 0 to 240°F subdivided 2°F.
Dozen **£11. 15. 0.** Each **£1. 1. 6.** c

Hortvet cryoscope thermometers see DC-806, DC-808.
Incubator and oven thermometers see HJ-108, IH-110, MV-616, MV-618 in List No. sequence.

All items on this page normally available from stock.

BECKMANN DIFFERENTIAL THERMOMETERS

Beckmann differential thermometers are used for the accurate measurement of very small changes in temperature, e.g. for boiling point and freezing point determinations. A fine capillary and large bulb enable the scale to be subdivided into 0·01°C, yet the thermometers can be used over a range of about 100°C or more.
Thermometers with zero at top of the scale are for freezing point determinations, i.e. for measuring with falling temperature; those with zero at bottom of scale are for boiling points, i.e. for measuring with rising temperature.

E-MIL solid stem differential thermometers, Beckmann type
These thermometers are readily set for any intermediate temperature by means of a measured droplet system which gives the true temperature value of each droplet passing through a constriction. This temperature value is engraved on the stem of each thermometer. An auxiliary scale at the top of the stem facilitates adjustment. Overall length about 570 mm, scale length about 270 mm, Immersion 150 mm.

TJ-510
THERMOMETER, Beckmann type, *E-MIL*, as specification, range 0 to 100°C, scale span 5 or 6°C, subdivided in 0·01°C, **with zero at top of scale.** Each **£9. 10. 0.** *m*

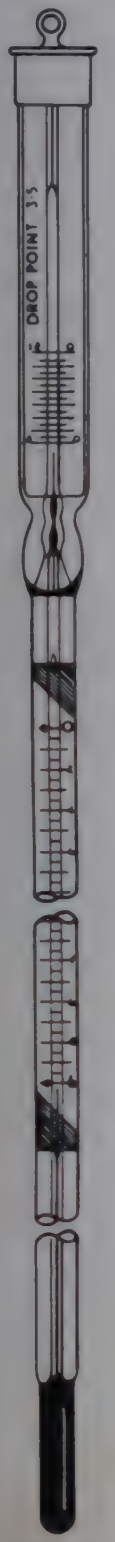
TJ-512
THERMOMETER, Beckmann type, *E-MIL*, as specification, range 0 to 100°C, scale span 5 or 6°C, subdivided in 0·01°C, **with zero at bottom of scale.**
Each **£9. 10. 0.** *m*

Enclosed Opal Scale Beckmann Thermometers
These thermometers are the conventional Beckmann design which are set for any intermediate temperature by means of a calibrated mercury reservoir above the top of the scale. Overall length about 550 mm, scale length about 230 mm. Immersion 150 mm.

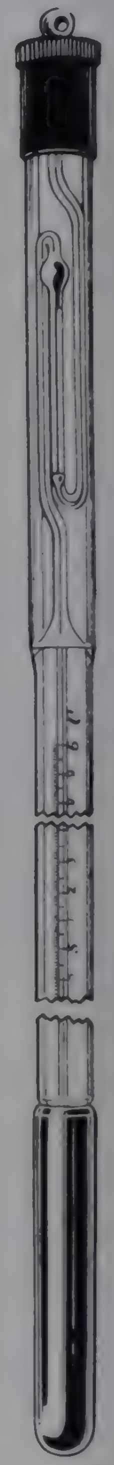
***TJ-521**
THERMOMETER, Beckmann, as specification, approximate range —10 to 150°C, scale span 5 or 6°C, subdivided in 0·01°C, **with zero at top of scale** Each **£8. 10. 0.** c

***TJ-523**
THERMOMETER, Beckmann, as specification, approximate range —10 to 150°C, scale span 5 or 6°C, subdivided in 0·01°C, **with zero at bottom of scale.**
Each **£8. 10. 0.** c

***TJ-525**
THERMOMETER, Beckmann, as specification, approximate range —10 to 150°C, scale span 1°C, subdivided in 0·002°C, **with zero at bottom of scale.**
Each **£10. 0. 0.** c



TJ-510



TJ-523

All items on this page normally available from stock.

CALORIMETER THERMOMETERS

6°C RANGE THERMOMETERS TO BS 791

This specification covers a range of seven solid stem thermometers, overall length about 750 mm, with maximum error of 0·1°C at any point and maximum change in error of 0·01°C for any interval of 0·5°C. They are subdivided in 0·01°C.

NPL certificates for these thermometers give the value of corrections at 11 points (each 0·5°C) to an accuracy of ±0·002°C.

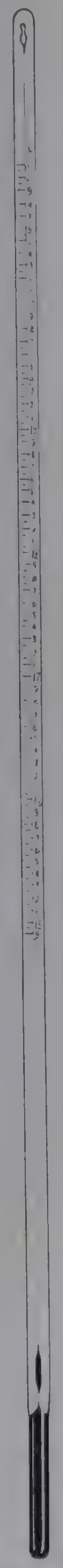
Provision can also be made for the selection of special grade NPL certified thermometers having an average change of interval error not greater than 0·004°C. This grade of thermometer can be investigated at closer intervals than 0·5°C if required. **Prices on application.**

Without certificate

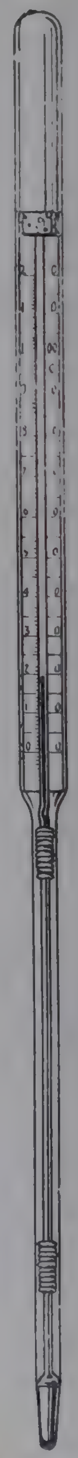
List No.	BS 791 Schedule mark	Scale span °C	Each	
***TJ-564**	Cal. 15 to 21 C	15 to 21	**£9. 5. 0.**	c
***TJ-566**	Cal. 18 to 24 C	18 to 24	**£9. 5. 0.**	c
***TJ-568**	Cal. 21 to 27 C	21 to 27	**£9. 5. 0.**	c
***TJ-570**	Cal. 24 to 30 C	24 to 30	**£9. 5. 0.**	c
***TJ-572**	Cal. 27 to 33 C	27 to 33	**£9. 5. 0.**	c
***TJ-574**	Cal. 30 to 36 C	30 to 36	**£9. 5. 0.**	c
***TJ-576**	Cal. 33 to 39 C	33 to 39	**£9. 5. 0.**	c

With NPL Certificate

List No.	BS 791 Schedule mark	Scale span °C	Each	
***TJ-565**	Cal. 15 to 21 C	15 to 21	**£26. 0. 0.**	m
***TJ-567**	Cal. 18 to 24 C	18 to 24	**£26. 0. 0.**	m
***TJ-569**	Cal. 21 to 27 C	21 to 27	**£26. 0. 0.**	m
***TJ-571**	Cal. 24 to 30 C	24 to 30	**£26. 0. 0.**	m
***TJ-573**	Cal. 27 to 33 C	27 to 33	**£26. 0. 0.**	m
***TJ-575**	Cal. 30 to 36 C	30 to 36	**£26. 0. 0.**	m
***TJ-577**	Cal. 33 to 39 C	33 to 39	**£26. 0. 0.**	m



TJ-564 to TJ-577



TJ-680

ENCLOSED OPAL GLASS SCALE THERMOMETERS

THERMOMETERS, enclosed opal glass scale, industrial type, **Centigrade scales,** for total immersion of stem. Length of scale 30 cm, stem diameter 11 mm, scale tube diameter about 19 mm.

List No.	Stem length cm	Scale span °C	Subdiv. °C	Dozen	Each	
TJ-680	15	0 to 110	1·0	**330/–**	**30/–**	c
	15	0 to 200	2·0	**390/–**	**36/–**	c
	15	0 to 360	2·0	**420/–**	**38/–**	c
TJ-682	30	0 to 110	1·0	**440/–**	**40/–**	c
	30	0 to 200	2·0	**470/–**	**43/–**	c
	30	0 to 360	2·0	**500/–**	**45/–**	c
TJ-684	60	0 to 110	1·0	**530/–**	**48/–**	c
	60	0 to 200	2·0	**560/–**	**51/–**	c
	60	0 to 360	2·0	**600/–**	**54/–**	c

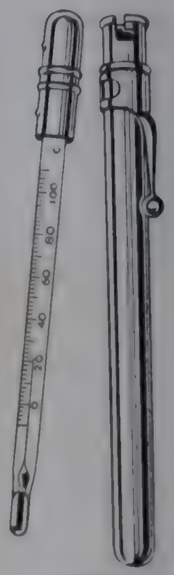
Also available with stem bent at right angles to scale and/or with stems up to 150 cm long.

All items on this page normally available from stock.

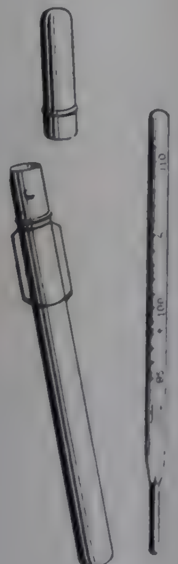
POCKET THERMOMETERS

TJ-802
THERMOMETER, pocket. A solid stem thermometer approx. 100 mm long fixed at the upper end into a metal cap which fits by means of a bayonet catch into a tubular case fitted with pocket clip. Overall length approx. 140 mm. Range −10° to 110°C in 2°C.
Dozen **£5.14. 0.** Each **£0.10. 3.** c

TJ-803
THERMOMETER, as TJ-802 but scaled 30° to 220°F in 2°F ... ... Dozen **£5.14. 0.** Each **£0.10. 3.** c



TJ-802



TJ-840

CLINICAL THERMOMETERS

THERMOMETERS, CLINICAL, to BS 691, solid stem lens front. The new classification 'long bulb' is approximately equivalent to the earlier $\frac{1}{2}$ min model. Scale span 95 to 110°F in 0·2°, in metal case. The BST mark (British Standards Tested) replaces the former NPL test which is no longer available.

List No.	Type	Dozen	Each	
TJ-840	'Long bulb' with works certificate	**72/-**	**7/2**	c
TJ-841	'Long bulb' BST stamped	**90/-**	**8/6**	c

SH-210
SOIL THERMOMETER. For details and prices see entry in List No. sequence.

THERMOMETER READERS

TJ-900
THERMOMETER READER, metal construction, with adjustable focusing eyepiece and spring loaded clip to accommodate thermometers up to 13 mm diameter.
Dozen **£24. 0. 0.** Each **£2. 4. 0.** c

TJ-905
THERMOMETER READER, with 4 cm long plastics lens held in a rubber moulding and giving an undistorted ×2$\frac{1}{4}$ magnification over a wide field. The magnifier clips onto thermometers or burettes up to 13 mm diameter by a stainless steel wire spring. Two pointers formed from the rubber moulding assist the accurate reading of the mercury or liquid meniscus.
Each **£1. 1. 0.** *f*

TJ-900

TJ-905

Gallenkamp
REGD TRADE MARK

THERMOMETER VIBRATOR

- **An end to thermometer tapping**
- **Eliminates errors from sticking mercury**

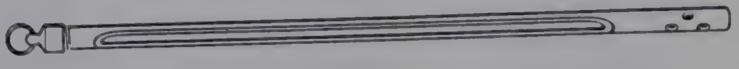
The electrically operated THERMOMETER VIBRATOR eliminates the sticking of mercury in capillaries of sensitive thermometers. It is a mains operated electro-magnetic vibrator mounted in a cylindrical housing which clips on the side of the thermometer. The press button control switch is housed in a bench mounting cast box. Two sizes of clips enable the vibrator to be fitted on thermometers with stem diameters ranging from 9–15 mm.

TJ-908
THERMOMETER VIBRATOR, *Gallenkamp*, electrically operated, with 2 pairs of clips, for 200/250V a.c. single phase supplies ... ... Each **£8.15. 0.** *b*

TJ-908

All items on this page normally available from stock.

THERMOMETER CASES

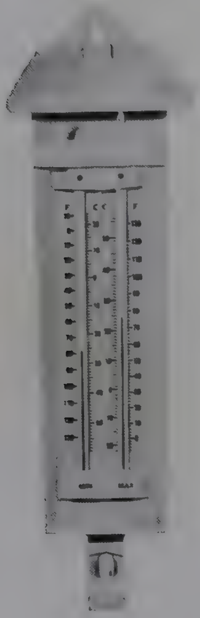


TJ-910

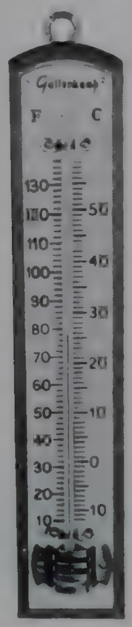
TJ-910

THERMOMETER CASES, brass, to take thermometers 5 to 7 mm diameter.

No.	1	2	
For thermometers, overall length	280 to 320	340 to 360 mm	
Dozen	**140/–**	**170/–**	c
Each	**12/9**	**15/6**	



TJ-930



TJ-952

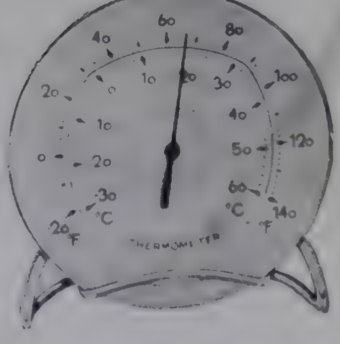
TJ-940

FACTORY
THERMOMETER
F
C

TJ-954

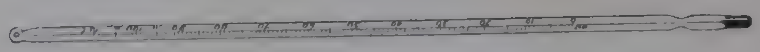
Gallenkamp
F

TJ-960



TJ-965

MAXIMUM AND MINIMUM AND WALL THERMOMETERS



TJ-920

TJ-920

THERMOMETERS, maximum, solid stem, overall length about 300 mm, stem diameter 6 to 7 mm. After use, the mercury is shaken down in the same manner as a clinical thermometer.

No.	1	2	3	
Scale span	–10 to 110	0 to 200	0 to 360°C	
Subdivision	1·0	1·0	2·0 °C	
Dozen	**430/–**	**450/–**	**740/–**	c
Each	**39/–**	**41/–**	**66/–**	

TJ-930

THERMOMETER, maximum and minimum, Six's pattern, to BS 2840, for wall mounting. Spirit in glass thermometer with mercury indicating thread and two metal cursors mounted on scale graduated –10 to +130°F, subdivided in 2°F in hard white plastics frame. Overall length about 270 mm. Complete with magnet.
Dozen **£16. 0. 0.** Each **£1. 9. 0.** c

TJ-931

THERMOMETER, maximum and minimum, Six's pattern, as TJ-930 but scaled –30 to +55°C in 1°C.
Dozen **£16. 0. 0.** Each **£1. 9. 0.** c

***TJ-940**

THERMOMETER, maximum and minimum, with auto-reset button. Spirit in glass thermometer with mercury indicating thread and two magnetically retained cursors which gravitate back to the mercury when released by pressing the button. The thermometer is mounted on a plastics frame graduated –36° to 50°C. Supplied with stand-off brackets for wall mounting.
Each **£1. 15. 0.** c

TJ-952

THERMOMETER, wall, solid stem, red spirit-in-glass, mounted on 21 × 4 cm hardwood base with ivorine scale graduated 20 to 120°F subdivided in 2°F and –5 to +50°C in 1°C. With bulb guard.
Dozen **£5. 0. 0.** Each **£0. 9. 3.** c

TJ-954

THERMOMETER, wall, to requirements of Factory Act. Solid stem, lens front, red spirit-in-glass on hardwood scale 250 mm graduated 20 to 120°F subdivided in 2°F with extra bold graduation and figure at 60°F and –10 to 50°C in 1°C. With bulb guard.
Dozen **£5. 0. 0.** Each **£0. 9. 3.** c

TJ-960

THERMOMETER, wall, circular dial pattern 15 cm dia. with black plastics frame, dial with black figures on satin aluminium. Scale range –20 to +140°F and –30 to +60°C ... Dozen **£13. 15. 0.** Each **£1. 5. 0.** c

TJ-965

THERMOMETER, bimetallic with 10 cm diameter dial scaled –20 to +140°F and –30 to +60°C, mounted in a metal case. Complete with a slot in the back of the case for wall mounting, and a wire frame for bench mounting ... ... Each **£0. 15. 0.** c

All items on this page normally available from stock.

PRECISION BIMETALLIC DIAL THERMOMETERS

These Swiss made precision thermometers provide a reliable, rugged alternative to mercury-in-glass thermometers for many laboratory purposes. The stems and dial cases are made of high grade stainless steel. A minimum immersion depth of 6 cm is necessary to attain the potential accuracy of 0·5% of full scale. Stem is 4 mm diameter.

***TJ-970**

DIAL THERMOMETERS, as specification, with dial 46 mm dia. and stem 200 mm long.

Scale span	−10 to 110	0 to 220	0 to 400	°C	
Subdivision	1	2	5	°C	
Each	£4. 0. 0.	£4. 4. 0.	£4. 4. 0.		c

ACCESSORY

***TJ-972** **Holding clip,** for TJ-970, nickel-plated brass, providing handle and mounting clip. Can be used as a clip to hold thermometer in water bath having wall thickness up to 6 mm. ... ... Each £0. 10. 3. c

100
150
50
200
0
220
°C

TJ-970 with TJ-972

TJ-980

***TJ-980**

DIAL THERMOMETER, as specification, **pocket pattern** with dial 24 mm dia. and stem 120 mm long, complete with pocket sheath and clip which also acts as a handle. Scale span 0 to 100°C ... Each **£2. 17. 0.** c

***TJ-990**

DIAL THERMOMETER, as specification, **surface pattern** for measuring temperature of flat surfaces such as hotplates. Dial 46 mm dia. Stem 39 mm long with copper end 25 mm dia. Scale span 0 to 400°C. Each **£4. 0. 0.** c

200
250
150
300
100
350
50
400
0
°C

TJ-990

ELECTRICAL THERMOMETERS

TK-070

THERMOMETER, electrical, battery operated with 9·5 cm scale range −50°C to 50°C subdivided every 1°C. With simple operating controls including calibration check and OFF positions. Sockets are provided for connecting **up to six temperature probes,** selection of which is by push buttons on the front panel. In metal case complete with battery. Overall dimensions 21 × 16 × 7·5 cm high. Requires but does not include one or more probes ... ... Each **£20. 0. 0.** *m*

TK-075

THERMOMETER, electrical, as TK-070 but range 10°C to 150°C. In metal case complete with battery. Requires but does not include one or more probes. Each **£20. 0. 0.** *m*

REPLACEMENT PART

TK-078 Battery, Mallory TR134R ... ... Each £0. 11. 6. f

ACCESSORIES

TK-080 **Temperature probe,** stainless steel, length 65 mm diameter 4 mm, mounted in handle 80 mm long and fitted with non-reversible plug and approximately 2 metres of cable ... ... Each £7. 12. 0. *m*

TK-084 **Temperature probe,** aluminium, length 15 mm diameter 6 mm, fitted with removable copper clip for surface temperature measurements, non-reversible plug and approximately 2 metres of cable. Dozen £45. 0. 0. Each £4. 2. 0. *m*

TK-088 **Carrying case** ... ... Each £2. 19. 0. *m*

TK-070
TK-075

All items on this page normally available from stock.

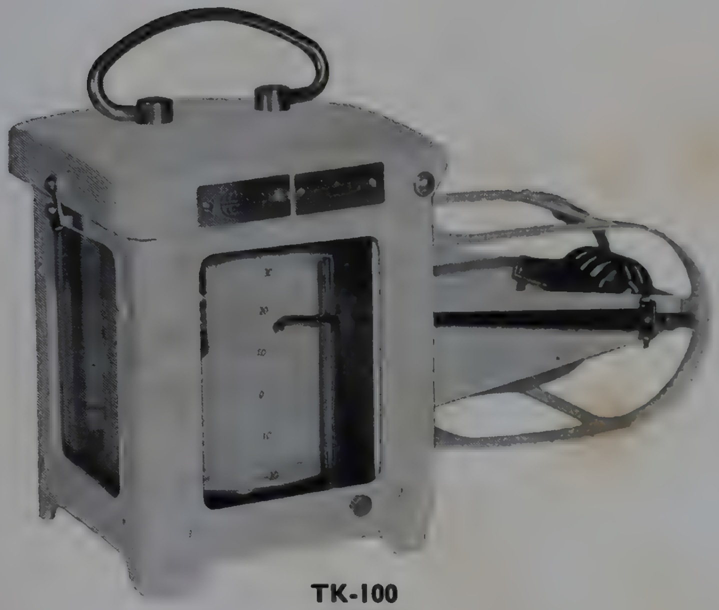
THERMOGRAPHS

STANDARD CHART RANGES °C

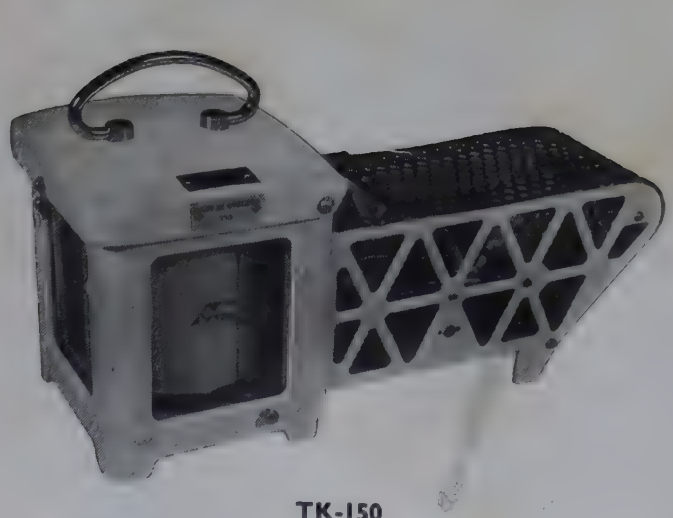
−10 to +40	20 to 70
0 to 50	30 to 80
10 to 60	50 to 100

TK-100

THERMOGRAPH, daily recording, clockwork drive, conforming to BS 3231. For recording air temperature in the vicinity of the instrument. The temperature is measured by a bimetallic strip and recorded as an ink trace on a scaled chart. Accuracy is to 1% of full scale. A screw adjustment is provided to raise or lower the temperature range subject to the total span of 50°C being maintained. With 100 charts of a **range to be selected by the user,** bottle of ink and instructions for use. Case white stove enamel finished ... Each **£33. 0. 0.***mN*



TK-100
TK-105



TK-150
TK-155

TK-105

THERMOGRAPH, as TK-100 but for **weekly recording.** With 100 charts of a **range to be selected by the user,** bottle of ink and instructions for use. Case white stove enamel finished ... ... Each **£33. 0. 0.***mN*

REPLACEMENT PARTS

TK-106	**Charts,** daily recording, range as selected. Box of 100	**£1. 5. 0.**	*mN*
TK-107	**Charts,** weekly recording, range as selected. Box of 100	**£1. 5. 0.**	*mN*

When ordering charts please specify range, selected from the ranges given above.

ACCESSORIES. See TK-164 to TK-178 below.

THERMOHYGROGRAPHS

Humidity range. All charts are scaled 0 100% rh.

TK-150

THERMOHYGROGRAPH, for daily recording, with clockwork drive. Temperature and relative humidity, measured by a bimetallic strip and prepared hair respectively, are recorded as ink traces on a scaled chart. The temperature accuracy is ± 1% of full scale and the humidity accuracy is ±3% between 20 and 80% r.h. With 100 charts, two bottles of differently coloured ink and instructions for use. Case white stove enamel finished.

Range −10 to +40°C, 0 to 100% r.h.	Each **£37. 0. 0.**	*mN*
Range 0 to +50°C, 0 to 100% r.h.	Each **£37. 0. 0.**	*mN*
Range 10 to +60°C, 0 to 100% r.h.	Each **£37. 0. 0.**	*mN*

TK-155

THERMOHYGROGRAPH, as TK-150 but **for weekly recording.** With 100 charts, two bottles of different coloured ink and instructions for use. Case white stove enamel finished.

Range −10 to +40°C, 0 to 100% r.h.	Each **£37. 0. 0.**	*m*
Range 0 to +50°C, 0 to 100% r.h.	Each **£37. 0. 0.**	*m*
Range 10 to +60°C, 0 to 100% r.h.	Each **£37. 0. 0.**	*m*

REPLACEMENT PARTS

TK-160	**Charts,** daily recording, range as selected. Box of 100	**£1. 5. 0.**	*mN*
TK-162	**Charts,** weekly recording, range as selected. Box of 100	**£1. 5. 0.**	*m*

When ordering charts please specify range, selected from the ranges given above.

ACCESSORIES FOR THERMOGRAPHS AND THERMOHYGROGRAPHS

TK-164	**Ink,** violet	Bottle	**£0. 3. 6.**	*m*
TK-166	**Ink,** green	Bottle	**£0. 3. 6.**	*m*
TK-170	**Pen, short,** for temperature trace.	Each	**£0. 4. 0.**	*m*
TK-172	**Pen, long,** for humidity trace ...	Each	**£0. 4. 0.**	*m*
TK-176	**Change wheels,** to convert daily to weekly recording.	Set	**£0. 15. 0.**	*m*
TK-178	**Change wheels,** to convert weekly to daily recording.	Set	**£0. 15. 0.**	*m*

NOTE: When ordering Thermohygrographs please state the temperature range selected from those listed. Each instrument can be used only with the temperature chart selected at the time of purchase.

Items on this page normally available from stock except those coded *N*.

IP STANDARD THERMOMETERS

Specified in *IP Standards for Petroleum and its Products*, Part 1, published by the Institute of Petroleum.

List No.	Designation	Test	Scale span	Divisions	Immersion mm	Total length mm	Dozen	Each
TK-502	IP 1F	Cloud and Pour	−36°F to +120°F	2°F	108	225	**250/–**	**23/–**
TK-503	IP 1C	Cloud and Pour	−38°C to +50°C	1°C	108	225	**310/–**	**28/–**
TK-504	IP 2F	Low Cloud and Pour	−112°F to +70°F	2°F	76	225	**310/–**	**28/–**
TK-505	IP 2C	Low Cloud and Pour	−80°C to +20°C	1°C	76	225	**310/–**	**28/–**
TK-506	IP 3F	Demulsification	30°F to 220°F	1°F	Total	—	**245/–**	**22/6**
TK-507	IP 3C	Demulsification	−1°C to +105°C	0·5°C	Total	—	**245/–**	**22/6**
TK-509	IP 4C	Crude Oil Distillation	−4°C to +360°C	2°C	Total	310	**420/–**	**38/–**
TK-511	IP 5C	Low Distillation	−2°C to +300°C	1°C	Total	380	**430/–**	**39/–**
TK-513	IP 6C	High Distillation	−2°C to +400°C	1°C	Total	380	**410/–**	**37/–**
TK-514	IP 8F	Redwood Low	30°F to 110°F	0·5°F	65	340	**255/–**	**23/6**
TK-515	IP 8C	Redwood Low	0°C to 44°C	0·2°C	65	340	**255/–**	**23/6**
TK-516	IP 9F	Redwood Medium	100°F to 180°F	0·5°F	65	340	**310/–**	**28/–**
TK-517	IP 9C	Redwood Medium	37·8°C to 82°C	0·2°C	65	340	**320/–**	**29/–**
TK-518	IP 10F	Redwood High	170°F to 250°F	0·5°F	65	340	**330/–**	**30/–**
TK-519	IP 10C	Redwood High	76°C to 122°C	0·2°C	65	340	**340/–**	**31/–**
TK-521	IP 14C	Cold Test	−80°C to +20°C	0·5°C	Total	300	**300/–**	**27/–**
TK-522	IP 15F	Pensky-Martens Low	20°F to 230°F	1°F	57	280	**330/–**	**30/–**
TK-523	IP 15C	Pensky-Martens Low	−7°C to 110°C	0·5°C	57	280	**340/–**	**31/–**
TK-524	IP 16F	Pensky-Martens High	200°F to 700°F	5°F	57	280	**400/–**	**36/–**
TK-525	IP 16C	Pensky-Martens High	90°C to 370°C	2°C	57	280	**410/–**	**37/–**
TK-526	IP 17F	Wax Setting Point	100°F to 180°F	0·2°F	79	365	**470/–**	**43/–**
TK-527	IP 17C	Wax Setting Point	38°C to 82°C	0·1°C	79	365	**430/–**	**39/–**
TK-528	IP 18F	Congealing Point	68°F to 213°F	0·5°F	Total	300	**420/–**	**38/–**
TK-529	IP 18C	Congealing Point	20°C to 100°C	0·25°C	Total	300	**420/–**	**38/–**
TK-531	IP 20C	Aniline Point Low	−38°C to +42°C	0·2°C	50	410	**390/–**	**36/–**
TK-533	IP 21C	Aniline Point High	25°C to 105°C	0·2°C	50	410	**390/–**	**36/–**
TK-535	IP 22C	Oxidation	195°C to 205°C	0·1°C	100	300	**660/–**	**60/–**
TK-536	IP 23F	Reid Vapour Pressure	94°F to 108°F	0·2°F	Total	260	**440/–**	**40/–**
TK-537	IP 23C	Reid Vapour Pressure	34°C to 42°C	0·1°C	Total	260	**560/–**	**51/–**
TK-538	IP 24F	Gum	204°F to 218°F	0·2°F	Total	260	**540/–**	**49/–**
TK-539	IP 24C	Gum	95°C to 103°C	0·1°C	Total	260	**580/–**	**52/–**
TK-540	—	Abel oil cup Fahrenheit	50°F to 150°F	1°F	—	228 approx.	**360/–**	**33/–**
TK-541	—	Abel oil cup Centigrade	10°C to 65°C	0·5°C	—	228 approx.	**370/–**	**34/–**
TK-542	—	Abel water bath Fahrenheit	90°F to 190°F	1°F	—	228 approx.	**370/–**	**34/–**
TK-543	—	Abel water bath Centigrade	32°C to 88°C	0·5°C	—	228 approx.	**370/–**	**34/–**
TK-544	IP 28F	Cleveland	20°F to 760°F	5°F	25	300	**410/–**	**37/–**
TK-545	IP 28C	Cleveland	−6°C to +400°C	2°C	25	300	**410/–**	**37/–**
TK-546	IP 29F	Kin Visc 68°F	66·5°F to 71·5°F †	0·1°F	Total	280	**1160/–**	**104/–**
TK-547	IP 29C	Kin Visc 20°C	18·6°C to 21·4°C †	0·05°C	Total	280	**1200/–**	**108/–**

†These thermometers have check scale.

IP Thermometers with NPL certificates. Prices on application.

All items on this page normally available from stock (code *c*)

IP STANDARD THERMOMETERS—(continued)

List No.	Designation	Test	Scale span	Divisions	Immersion mm	Total length mm	Dozen	Each
TK-548	IP 30F	Kin Visc 77°F	74·5°F to 79·5°F †	0·1°F	Total	280	**1200/–**	**108/–**
TK-549	IP 30C	Kin Visc 25°C	23·6°C to 26·4°C †	0·05°C	Total	280	**920/–**	**84/–**
TK-550	IP 31F	Kin Visc 100°F	97·5°F to 102·5°F †	0·1°F	Total	280	**880/–**	**80/–**
TK-551	IP 31C	Kin Visc 37·8°C	36·6°C to 39·4°C †	0·05°C	Total	280	**1180/–**	**106/–**
TK-552	IP 32F	Kin Visc 210°F	208·5°F to 213·5°F †	0·1°F	Total	280	**960/–**	**86/–**
TK-553	IP 32C	Kin Visc 98·9°C	98·6°C to 101·4°C†	0·05°C	Total	280	**1140/–**	**104/–**
TK-554	IP 33F	Kin Visc 32°F	29°F to 35°F	0·1°F	Total	280	**920/–**	**84/–**
TK-555	IP 33C	Kin Visc 0°C	−2°C to +2°C	0·05°C	Total	280	**800/–**	**72/–**
TK-556	IP 34F	Kin Visc 130°F	127°F to 133°F†	0·1°F	Total	280	**1200/–**	**108/–**
TK-557	IP 34C	Kin Visc 54·4°C	52·5°C to 56·5°C†	0·05°C	Total	280	**1200/–**	**108/–**
TK-558	IP 35F	Kin Visc 140°F	137°F to 143°F†	0·1°F	Total	280	**1120/–**	**102/–**
TK-559	IP 35C	Kin Visc 60°C	58°C to 62°C†	0·05°C	Total	280	**1120/–**	**102/–**
TK-560	IP 36F	Kin Visc 200°F	197°F to 203°F†	0·1°F	Total	280	**1200/–**	**108/–**
TK-561	IP 36C	Kin Visc 93·3°C	91°C to 95°C†	0·05°C	Total	280	**1200/–**	**108/–**
TK-563	IP 37C	Sludge	144°C to 156°C	0·2°C	100	270	**640/–**	**58/–**
TK-565	IP 38C	Pen and Duct	23°C to 27°C	0·1°C	Total	260	**570/–**	**52/–**
TK-566	IP 39F	Specific Gravity	30°F to 100°F	0·2°F	Total	440	**380/–**	**35/–**
TK-567	IP 39C	Density	−1°C to +38°C	0·1°C	Total	440	**380/–**	**35/–**
TK-569	IP 40C	Drop Point Low	20°C to 120°C	1°C	100	250	**400/–**	**36/–**
TK-571	IP 41C	Drop Point High	100°C to 230°C	1°C	100	250	**390/–**	**36/–**
TK-573	IP 42C	Breaking Point	−38°C to +30°C	0·5°C	250	370	**570/–**	**52/–**
TK-574	IP 43F	FP Cut-back (Int)	50°F to 230°F	1°F	—	305 approx.	**570/–**	**52/–**
TK-575	IP 43C	FP Cut-back (Int)	10°C to 110°C	0·5°C	—	305 approx.	**570/–**	**52/–**
TK-576	IP 44F	FP Cut-back (Ext)	60°F to 250°F	1°F	—	305 approx.	**540/–**	**49/–**
TK-577	IP 44C	FP Cut-back (Ext)	15°C to 121°C	0·5°C	—	305 approx.	**540/–**	**49/–**
TK-579	IP 45C	Refractometer	15°C to 22°C	0·1°C	22	160	**820/–**	**74/–**
TK-580	IP 46F	Gravity Balance	58°F to 70°F	0·2°F	Total	160	**820/–**	**74/–**
TK-581	IP 46C	Gravity Balance	14·5°C to 21°C	0·1°C	Total	160	**820/–**	**74/–**
TK-583	IP 47C	Loss on Heating	150°C to 175°C	0·5°C	Total	150	**330/–**	**30/–**
TK-607	IP 59C	Aniline Point Special	90°C to 170°C	0·2°C	50	410	**420/–**	**38/–**
TK-609	IP 60C	Ring and Ball Low	−2°C to 80°C	0·2°C	Total	390	**350/–**	**32/–**
TK-611	IP 61C	Ring and Ball High	30°C to 200°C	0·5°C	Total	390	**350/–**	**32/–**
TK-612	IP 62F	Drop Point Special	20°F to 580°F	2°F	76	379 to 383	**470/–**	**43/–**
TK-613	IP 62C	Drop Point Special	−5°C to 300°C	1°C	76	379 to 383	**470/–**	**43/–**
TK-615	IP 63C	MP Petrolatum	32°C to 127°C	0·2°C	79	368	**440/–**	**40/–**
TK-616	IP 64F	Specific Gravity, wide range	−5°F to +215°F	0·5°F	Total	406	**370/–**	**34/–**
TK-617	IP 64C	Density, wide range	−20°C to +102°C	0·2°C	Total	406	**410/–**	**37/–**

† These thermometers have check scale. ‡ Thermometers TK-618 and TK-619 are mercury-thallium filled.

IP Thermometers with NPL certificates. Prices on application.

All items on this page normally available from stock (code *c*)

IP STANDARD THERMOMETERS—(continued)

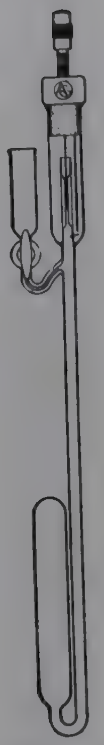
List No.	Designation	Test	Scale span	Divisions	Immersion mm	Total length mm	Dozen	Each
TK-618	IP 65F	Kin Visc Low	−61°F to − 29°F†	0·2°F	Total	406	**1640/–**	**150/–**
TK-619	IP 65C	Kin Visc Low	—51·6°C to −34°C†	0·1°C	Total	406	**1640/–**	**150/–**
TK-620	IP 66F	Kin Visc 122°F	119·5°F to 124·5°F†	0·1°F	Total	280	**1000/–**	**90/–**
TK-621	IP 66C	Kin Visc 50°C	48·6°C to 51·4°C†	0·05°C	Total	280	**1100/–**	**100/–**
TK-622	IP 67F	Kin Visc 0°F	−2·5°F to +2·5°F†	0·1°F	Total	305	**1140/–**	**104/–**
TK-623	IP 67C	Kin Visc −17·8°C	−19·2°C to −16·4°C†	0·05°C	Total	305	**1140/–**	**104/–**
TK-624	IP 68F	Kin Visc −40°F	−42·5°F to −37·5°F†	0·1°F	Total	305	**1640/–**	**150/–**
TK-625	IP 68C	Kin Visc −40°C	−41·4°C to −38·6°C†	0·05°C	Total	305	**1800/–**	**165/–**
TK-626	IP 69F	Kin Visc −65°F	−67·5°F to −62·5°F†	0·1°F	Total	305	**1880/–**	**170/–**
TK-627	IP 69C	Kin Visc −53·9°C	−55·3°C to −52·5°C†	0·05°C	Total	305	**1880/–**	**170/–**
TK-629	IP 70C	TOST	72°C to 126°C	0·2°C	100	375	**580/–**	**52/–**
TK-630	IP 71F	Kin Visc −15°F	−17·5°F to −12·5°F†	0·1°F	Total	305	**1140/–**	**104/–**
TK-631	IP 71C	Kin Visc −26·1°C	−27·5°C to 24·7°C†	0·05°C	Total	305	**1140/–**	**104/–**
TK-632	IP 72F	Oil in wax	−35°F to +70°F	1°F	76	350 to 355	**430/–**	**39/–**
TK-633	IP 72C	Oil in wax	−37°C to +21°C	0·5°C	76	350 to 355	**430/–**	**39/–**
TK-634	IP 73F	Partial immersion	20°F to 760°F	2°F	76	406	**470/–**	**43/–**
TK-635	IP 73C	Partial immersion	−5°C to +400°C	1°C	76	406	**470/–**	**43/–**
TK-636	IP 74F	Abel oil cup wide range	−35°F to +160°F	1°F	61	310	**440/–**	**40/–**
TK-638	IP 75F	Abel water bath wide range	−25°F to +180°F	1°F	89	310	**440/–**	**40/–**
TK-640	IP 76C	Engler Viscosity	10°C to 55°C	0·5°C	93	240	**640/–**	**58/–**
TK-642	IP 77C	Solvents Distillation	−2°C to ±52°C	0·2°C	100	400	**860/–**	**78/–**
TK-644	IP 78C	Solvents Distillation	24°C to 78°C	0·2°C	100	400	**940/–**	**86/–**
TK-646	IP 79C	Solvents Distillation	48°C to 102°C	0·2°C	100	400	**940/–**	**86/–**
TK-648	IP 80C	Solvents Distillation	72°C to 126°C	0·2°C	100	400	**940/–**	**86/–**
TK-650	IP 81C	Solvents Distillation	98°C to 152°C	0·2°C	100	400	**980/–**	**88/–**
TK-652	IP 82C	Solvents Distillation	95°C to 255°C	0·5°C	100	400	**1000/–**	**90/–**
TK-654	IP 83C	Solvents Distillation	123°C to 177°C	0·2°C	100	400	**700/–**	**64/–**
TK-656	IP 84C	Solvents Distillation	148°C to 202°C	0·2°C	100	400	**720/–**	**66/–**
TK-658	IP 85C	Solvents Distillation	173°C to 227°C	0·2°C	100	400	**760/–**	**68/–**
TK-660	IP 86C	Solvents Distillation	198°C to 252°C	0·2°C	100	400	**800/–**	**72/–**
TK-662	IP 87C	Solvents Distillation	223°C to 277°C	0·2°C	100	400	**820/–**	**74/–**
TK-664	IP 88C	Solvents Distillation	248°C to 302°C	0·2°C	100	400	**840/–**	**76/–**
TK-666	IP 89F	Softening Point, wide range	30°F to 350°F	1°F	Total	400	**760/–**	**68/–**
TK-668	IP 89C	Softening Point, wide range	−1°C to 175°C	0·5°C	Total	400	**760/–**	**68/–**

† These thermometers have a check scale. Thermometers TK-624, TK-625, TK-626 and TK-627 are mercury-thallium filled.

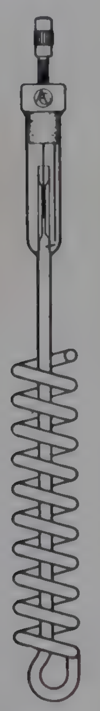
IP THERMOMETERS with NPL certificates. Prices on application.

Thermometers IP 48F to 58F and IP 48C to 58C inclusive are a series of tank thermometers for oil measurement. Prices on application.

All items on this page normally available from stock (code *c*)



TM-450



TM-460

TM-470

TM-450

THERMOREGULATOR, liquid expansion type, borosilicate glass, the bulb being proportioned to give rapid response. The side tube for adjusting the mercury level is shaped so that the mercury rises past it without leaving an air bubble. The contact head is a push fit into the glass part, and is fully protected electrically. A wire from the head dips into a small quantity of mercury in the annular space between the capillary and the tube enclosing it and makes contact with the mercury column by a thin wire fused through the wall. This eliminates all external connections and allows the regulator to be almost fully immersed in the bath. The adjustable contact has a spring tensioning device which gives a smooth, easy action and definite electrical contact. The thermoregulator is supplied with a length of 2-core cable. **It must be used in conjunction with an electronic relay.** EC-780 is recommended. **Supplied empty.** Each **£4. 0. 0.** *a*

REPLACEMENT PART

TM-452 Glass part ... ... Each £1. 16. 0. *a*

TM-460

THERMOREGULATOR, precision liquid expansion type, similar to TM-450 but with more sensitive element and smaller bore capillary tube. The element comprises 10 turns of glass tubing wound on a 2·5 cm former and having a 75 cm developed length. The stopcock and side tube are omitted in order to achieve the maximum temperature stability. This thermoregulator may be immersed up to the level of the capillary tube. **It must be used in conjunction with an electronic relay.** EC-780 is recommended. **Supplied empty.** Each **£4. 0. 0.** *a*

REPLACEMENT PART

TM-462 Glass part ... ... Each £1. 16. 0. *a*

TM-470

THERMOREGULATOR PROPORTIONING HEAD, *AEI*, for use with liquid expansion thermoregulators TM-452 or TM-462. It provides a means to overcome the difficulty of regulating the power input to balance heat losses at the operating temperature, which, coupled with the considerable heat capacity of most thermoregulators, makes it difficult to obtain the most precise control. Briefly, the device operates by a heated bimetal strip which withdraws the contact wire when contact is made with the mercury. Ultimately the 'on' to 'off' time ratio of the heater exactly balances the heat losses, and very fine control is obtained. **The proportioning head must be used in conjunction with electronic relay ED-220** ... ... Each **£9. 5. 0.** *f*

Gallenkamp **ELECTRONIC RELAY**

A **transistorised** relay for use with liquid expansion thermoregulators. Switching capacity up to 20A at 250V a.c. Control circuit operates on 12 mA at 8V d.c. from internal source. The relay therefore places a negligible load on the contacts of the thermoregulator. Both normally open and normally closed power contacts are incorporated.

See EC-780 in List No. sequence.

All items on this page normally available from stock.

JACKSON THERMOREGULATOR

(U.K. Patent number 660,221)

This thermoregulator is a mercury-in-glass contact thermometer intended primarily for laboratory use, but applicable wherever fine temperature control is required. It is capable of continuous trouble-free control in the range 0 to 100°C to within ±0·01°C without attention when used with correct ancillary equipment.

In principle it comprises a Beckmann mercury thermometer, with an arbitrary scale, to which electrical contacts have been fitted. One is sealed below the scale; the other is movable and may be set by a screw adjustment at any point on the scale.

Beckmann feature. The upper end of the capillary opens into a large expansion chamber filled with inert gas. Sealed to the top of the capillary is a short funnel tube of narrow bore, which is flanged over the greater part of its circumference. The flange fits closely in the expansion chamber and with it forms an annular reservoir for mercury. To raise the range of the thermoregulator, mercury is transferred from the bulb to the annulus, and vice versa.

Mercury seal. The movable contact wire enters the expansion chamber through a mercury seal, in which the mercury is permanently confined to a small sealing chamber constituted by a number of elongated bulbs blown on a length of capillary tube closely fitting the wire.

Adjusting head. Motion of the contact wire is effected by means of a fine screw-thread device housed in an insulating body and controlled by a knurled cap. Each full revolution of the cap covers one division of the scale. Connection to the relay is made through a length of twin cable.

Outer envelope. For purposes of electrical insulation and mechanical strength, all glass parts above the bulb are enclosed in an outer glass envelope.

Control circuit. The thermoregulator must be used in conjunction with a suitable relay. Electronic relay EC-780 is strongly recommended in order to achieve maximum sensitivity and long life.

Dimensions

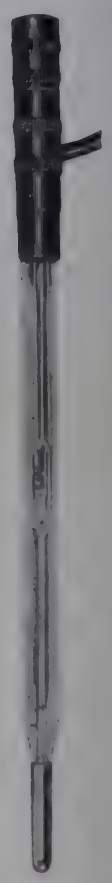
Overall length 32 cm.
Scale length 4 cm (0–10 subdivided 0·2).
Scale range 10°C approx.

TM-475

THERMOREGULATOR, Jackson, as specification.
Each **£8. 5. 0.** *m*

FIXED CONTACT THERMOMETERS

These can be supplied to order. Available with single or multi-contacts set to specified temperatures. Also available with standard cone joint for fitting in side neck of reaction flasks. When ordering please state temperature and preferred dimensions.



TM-475

TM-480

ADJUSTABLE CONTACT THERMOMETERS

These adjustable contact mercury thermometers are capable of controlling temperatures to within 0·01°C provided that the correct ancillary equipment is used.

The thermometers are sealed and hydrogen filled to prevent oxidation of the contact wire and the mercury surface. The lower end of the contact wire indicates exactly the same temperature as the oval adjusting nut on the upper setting scale. The adjusting screw is enclosed in the enlarged upper portion of the thermometer bore and carries a small armature which is rotated by a permanent magnet located in the bakelite cap.

It is essential to use a relay with a contact thermometer and electronic relay EC-780 is strongly recommended in order to achieve maximum sensitivity and long life.

***TM-480**

THERMOREGULATORS, adjustable contact thermometers, straight stem with opal glass scales, immersion depth 150 mm.

Scale span	0 to 50	100	200	350 °C	
Subdivision	1	1	2	5°C	
Each	**£6. 0. 0.**	**£6. 0. 0.**	**£6. 10. 0.**	**£7. 10. 0.**	c

ACCESSORY

***TM-482 Protective casing, metal, screwed ¾ in BSP.**
Each **£2. 7. 0.**

All items on this page normally available from stock.

Compenstat[†] TEMPERATURE CONTROLLER

† Regd. Trade Mark (U.K. Patent No. 882,942)

The *Compenstat* temperature controller is a *Gallenkamp* designed and manufactured thermostat which is fitted to a wide range of *Gallenkamp* laboratory equipment. It is sensitive and stable and gives accurate and reliable temperature control when installed in accordance with simple instructions. The *Compenstat* is readily built into equipment because the sensing bulb is connected by a flexible capillary tube to the control head. The bulb position can therefore be chosen for maximum efficiency, while the head can be independently positioned to suit the overall design of the equipment.

The *Compenstat* comprises basically a sensing bulb, a capillary connecting tube and a control head. The system is unaffected by barometric pressure variations. A scale plate calibrated in deg. C facilitates temperature setting. In operation the bulb is heated until the expansion of the filling liquid extends a bellows which actuates a microswitch and turns off the heaters. Compensation for ambient temperature effects on the control head is provided. Rapid temperature response is obtained by a heat feed-back system which consists of a heater fixed to the capillary tube which is connected in series with the heating load. The heat feed-back enables the *Compenstat* to anticipate the approach of the desired temperature and thus prevent overshoot. During steady operation it provides a form of proportional control and reduces fluctuations to a minimum.

NOTE: Replacement *Compenstats* for *Gallenkamp* apparatus are available factory assembled and may be ordered specifically for the individual apparatus.

0
10
20
30
40
50
60
70
80
90
100
°C
Compenstat
BRIT PAT No 882942
MADE IN ENGLAND

TM-500

- **Prepacked kits—easily installed**
- **Direct temperature scale**
- **Temperature fluctuation 0·25°C**
- **Good long term stability**
- **Ambient temperature compensation**

These *Compenstat* kits are for user installation in ovens, incubators, liquid baths, etc. not of *Gallenkamp* manufacture.
The performance of the equipment depends upon several factors, but if the instructions are carefully observed, there should be no difficulty in obtaining satisfactory results.

Each *Compenstat* kit includes all necessary parts and materials for making up capillary heaters for a wide range of heating loads, together with full instructions for installation. **The microswitch, which has single pole changeover contacts, is rated at 15A a.c. non-inductive.** For higher loads and for all d.c. applications a relay must be used (see EC-780).

DIMENSIONS

Bulb	6 in long, ¼ in diameter (15 cm × 0·6 cm)
Capillary	42 in long (105 cm)
Head (overall)	1¼ in high × 4½ in wide × 2¾ in deep (3 × 12 × 7 cm)

TM-500
COMPENSTAT KIT, *Gallenkamp*, as specification, for use in incubators, ovens, etc. Range 0–100°C. Each **£12. 10. 0.** *b*

TM-501
COMPENSTAT KIT, *Gallenkamp*, as TM-500 but range 30–200°C ... ... Each **£12. 10. 0.** *b*

TM-505
COMPENSTAT KIT, *Gallenkamp*, as TM-500 but with $\frac{5}{16}$ in BSF union on capillary to make a liquid tight seal in water or oil baths. Capillary length from head to union 13½ in (34 cm), from union to bulb 4 in (10 cm). Range 0–100°C ... ... Each **£12. 10. 0.** *b*

TM-506
COMPENSTAT KIT, *Gallenkamp*, as TM-505 but range 30–200°C ... ... Each **£12. 10. 0.** *b*

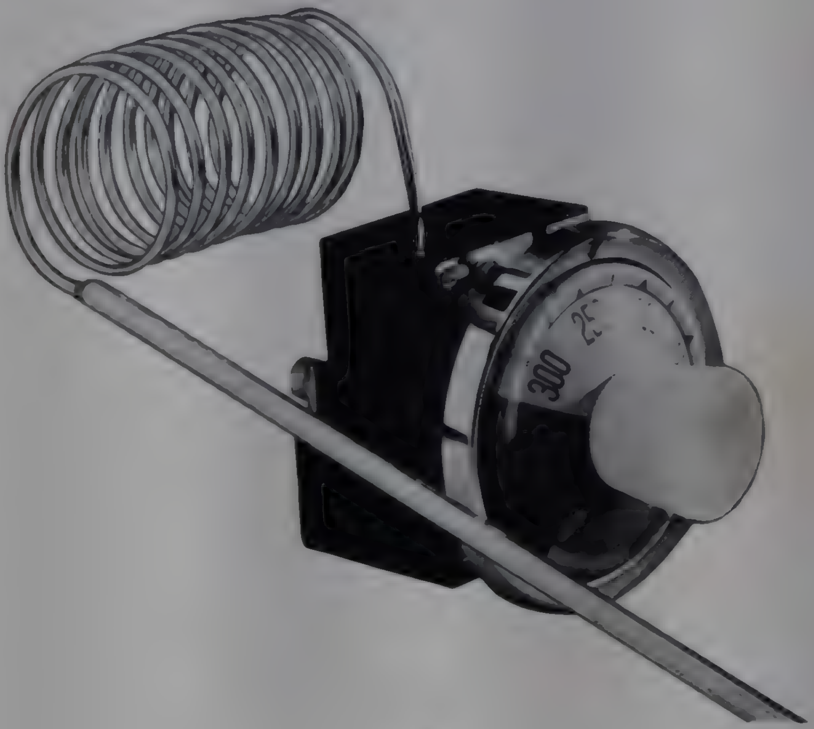
REPLACEMENT PART
TM-507 Microswitch ... ... Each **£0. 11. 6.** c

All items on this page normally available from stock.

GENERAL PURPOSE THERMOSTAT

TM-790

THERMOSTAT, general purpose, 20–110°C. An hydraulic thermostat for building into equipment where a switching differential of nominally 4°C is adequate. Especially suitable for use as a safety thermostat. Incorporates a single pole switch for ON/OFF switching of up to 20A at 250V non-inductive loads. Not recommended for currents below 0·5A. With locating lugs and suitable for fixing by a screwed nosepiece to panels up to $\frac{1}{4}$ in thickness. Capillary length approximately 100 cm. Supplied with knob and escutcheon. Each **£2.18. 0.** c



TM-790

BIMETAL THERMOSTATS

These thermostats comprise a helix of bimetal fixed at one end to a stem and the other end to an operating rod. A change of temperature causes the helix to twist and this motion is transmitted to the switch within the head.

The switch differentials quoted are the changes of temperature which will cause the thermostats to open or close, and not the performance of the apparatus to which they are fitted.

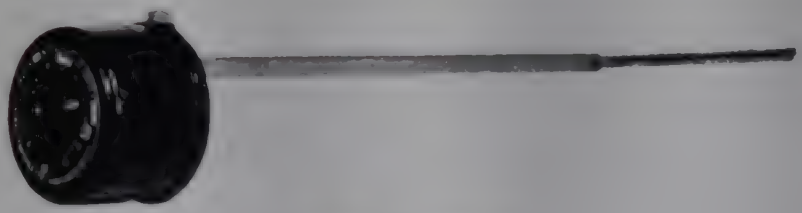
Although set for optimum performance when supplied, the contact pressure, and hence the differential can be increased or decreased.

The thermostats have arbitrary scales and stems, are virtually rustless and only require a protective pocket if inserted through the side of a bath, below the liquid level.

For the best results a relay should be used, since a low control current results in close control and satisfactory service over long periods of time. A relay is essential for Type TS3. Type TS8 will operate up to 2·5A a.c. or 0·1A d.c. at 250V without relay.

Suitable relays see EC-780, ED-101, ED-200 and ED-210 in List No. sequence.

List No.	AEI Type	Max. temp. °C	Range of adjustment °C	Differential °C	Stem lengths in	Each	
TM-800	TS1	300	40	±0·25	6	**£5. 9. 6.**	*m*
TM-810	TS2	300	120	±0·25	6	**£5. 9. 6.**	*m*
TM-812					12	**£6. 2. 0.**	*m*
TM-820	TS3	150	40	±0·1	10	**£5.16. 6.**	*m*
TM-830	TS8	300	250	±0·5	10	**£7. 9. 6.**	*m*



TM-800 to TM-830

All stock instruments have contacts normally closed, opening with temperature rise. All except TM-830 can be supplied with normally open contacts to order.

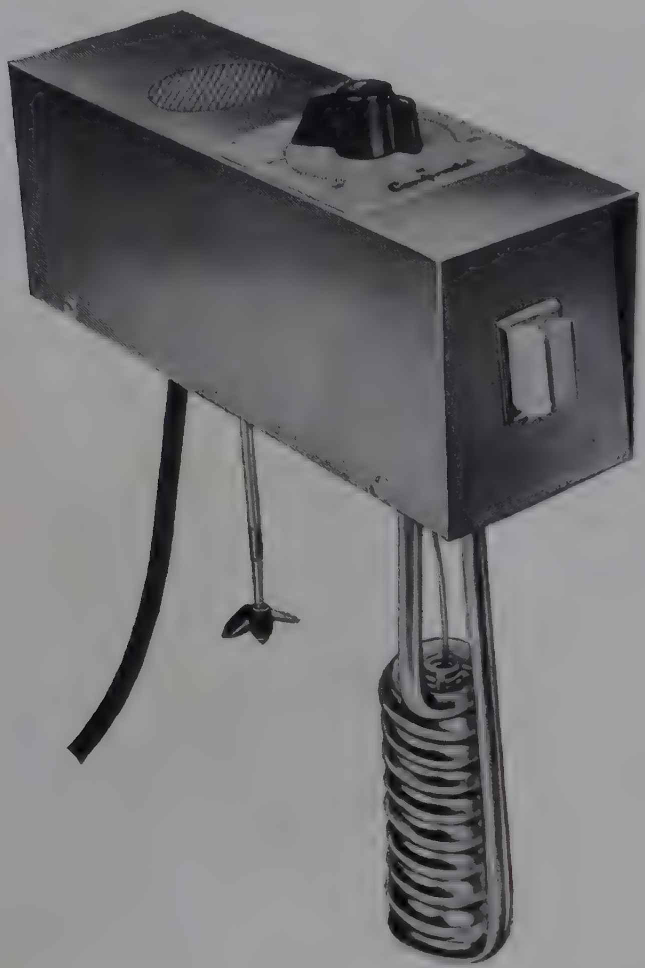
ACCESSORY

TM-835 **Pockets, brass, electro-tinned, for *AEI* TS thermostats.**

Length	6	10	12 in	
Each	**15/6**	**17/–**	**17/6**	*m*

AQUARIUM THERMOSTAT see BL-130 in List No. sequence.

All items on this page normally available from stock.



TM-840

OPERATION

The Thermo Stirrer is mounted on a filled water or oil bath by means of either the retort rod fitting or the adjustable clamp (see Accessories). The operator sets the required control temperature on the *Compenstat* scale and switches on the mains supply. The Thermo Stirrer agitates the bath liquid continuously and heats it to the control temperature. A load indicator lamp shows the ON/OFF cycling of the heater which occurs as the control temperature is maintained.

DIMENSIONS	H W D
Control box	12 × 8 × 28 cm
Overall	30 × 8 × 28 cm
Minimum essential depth of bath	18 cm
Clearance between underside of case and water level	
Maximum	5·0 cm
Minimum	1·5 cm
Weight	3 kg
Power rating, max.	1500W

Gallenkamp
REGD TRADE MARK

For converting suitable tanks into temperature controlled water or oil baths. Both models incorporate heaters, thermostats and efficient stirrers which can be converted into pumps for the external circulation of water at controlled temperatures.

THERMO STIRRER I

- **Temperature controlled by** *Compenstat*
- **Stainless steel outer case**
- **1500W, sheathed immersion heater**

PERFORMANCE

The powerful stirrer and heater combine with the sensitive *Compenstat* controller to provide good performance to even the simplest bath. For example, glass tanks filled with liquid can be controlled over a wide range of temperature **with a fluctuation of 0·4°C or less** and a variation of 0·3°C or less in the working space.

BATH DESIGN

For optimum performance from the Thermo Stirrer, the following points are relevant when selecting the bath:

1. The bath should be regular in shape with comparable length, breadth and depth.
2. It should be large enough to allow free circulation around the load (in this connection it is often useful to incorporate a "false floor").
3. For use above 50°C, it should be insulated and fitted with a cover to reduce evaporation losses.
4. For use at or near ambient temperature, a cooling coil should be fitted.

TM-840

THERMO STIRRER I, *Gallenkamp*, as specification including *Compenstat*, motor driven stirrer, and sheathed heater but **without retort rod mount or adjustable clamp.** For single phase a.c. supplies only.

For 220/240V	Each	**£25**. 0. 0.	*b*
For 200/210V	Each	**£25**. 0. 0.	*bN*
For 110/120V	Each	**£25**. 0. 0.	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

WF-363	**Stirrer motor ... ...**	**For prices see entries in List No. sequence.**
WF-365	**Heating element, 1500W.**	

When ordering replacement parts please state serial number of Thermo Stirrer and supply voltage.

ACCESSORIES

TM-844	**Retort rod mount.** This fitting enables the unit to be mounted from a retort stand or scaffold by means of a bosshead	Each	£0. 19. 6.	*b*
TM-846	**Clamp, adjustable.** This clamp enables the unit to be mounted on the rim of a water bath. Adjustable for wall thicknesses between 0·5 cm and 3 cm.	Each	£1. 13. 0.	*b*

WF-376	**Pump, for circulating water to external apparatus ...**	**For full details and prices see entries in List No. sequence.**
TM-958	**Constant level device ...**	

Items on this page normally available from stock except those coded *N*.

THERMO STIRRERS

- **Temperature range from ambient plus 5°C to 100°C**
- **Quiet and reliable operation**
- **Suitable for a wide range of water bath sizes**
- **Direct reading thermostats**

THERMO STIRRER 2

- **Temperature controlled by contact thermometer and solid state relay**
- **Stainless steel outer case**
- **1000W heater on standard model. 1500W accessory heater available**

PERFORMANCE

With the standard 1000W heater this Thermo Stirrer will provide high performance to simple baths. For example, glass tanks filled with liquid can be controlled from ambient to 90°C **with fluctuation of 0·05°C or less** and a temperature variation of 0·3°C or less. Long term stability is excellent.

The accessory 1500W heater TM-874 (available only for 200/210 and 220/240V) is for use with larger baths and heavier work loads. It replaces the standard heater in use.

BATH DESIGN

The notes concerning bath design on the opposite page apply also to this Thermo Stirrer.

OPERATION

Three heater powers and switching modes may be selected to allow adjustment for minimum temperature fluctuation. The three settings are:

Full power switched on and off by the thermostat.
Half power switched on and off by the thermostat.
Half power on continuously and the other half power switched on and off by the thermostat.

DIMENSIONS	H	W	D
Overall, without contact thermometer	26 ×	12 ×	21 cm
Overall, with contact thermometer fitted	33 ×	12 ×	21 cm
Minimum essential depth of bath			16 cm
Clearance between underside of case and water level			
Maximum			4 cm
Minimum			3 cm
Weight			2 kg
Power rating, max.			1000W
Power rating, with 1500W accessory heater			1500W

Gallenkamp
THERMO STIRRER

TM-860 with TM-870 and WF-376

TM-860

THERMO STIRRER 2, *Gallenkamp*, as specification with motor driven stirrer, heater, and solid state electronic switching. Complete with contact thermometer range 0–100°C. For single phase supplies.

For 220/240V 50 Hz	Each	**£35. 10. 0.** *b*
For 200/210V 50 Hz	Each	**£35. 10. 0.** *bN*
For 110/120V 60 Hz	Each	**£35. 10. 0.** *bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

TM-864	**Heating element, 1000W.** ...	Each	**£3. 14. 0.**	*b*
TM-866	**Contact thermometer,** range 0–100°C.	Each	**£7. 10. 0.**	*b*
WF-363	**Stirrer motor.** For details and price see entry in List No. sequence.			

When ordering replacement parts please state serial number of Thermo Stirrer and supply voltage.

ACCESSORIES

TM-870	**Cooling coil,** with fixing plate ...	Each	**£3. 10. 0.**	*b*
NOTE:	**This accessory increases the minimum essential working depth of the bath to 20 cm.**			
TM-872	**Holder for mercury in glass thermometer.**	Each	**£0. 11. 0.**	*b*
TM-874	**Heater,** 1500W **not available for 110/120V.**	Each	**£3. 14. 0.**	*b*
TM-844	**Retort rod mount.** For price see entry in List No. sequence.			
WF-376	**Pump,** for circulating water to external apparatus. ...	For full details and prices see entries in List No. sequence.		
TM-958	**Constant level device** ...			

Items on this page normally available from stock except those coded *N*.

THERMOSTATIC BATH HEATERS

TM-940

BATH HEATER, *Tempette* TE 1, a thermostatic controller which can be clamped to water baths. With a 1000W heater it will maintain constant temperatures with a fluctuation of 0·4°C between ambient and 95°C. Water can be circulated through external apparatus at the same level at up to 4 litres/min. Maximum back pressure level 90 cm. The bath temperature is set by a dial graduated in °C. Weight 1·5 kg. Requires only 17 cm depth of water. For 200/250V 50 Hz supplies.
Each **£21. 0. 0.** *f*

TM-950

BATH HEATER, *Tempunit* TU8, a thermostatic control unit which can be attached to any water bath and will maintain a constant temperature with fluctuation 0·1°C or better between 15° and 95°C. Under optimum conditions 0·01°C can be achieved. A six bladed stirrer driven by a shaded pole motor rotates under a 1000W heater coil. Temperature control is by a bimetal helix which operates a pneumatic capsule. The temperature scale has two pointers, one for setting and the other indicating actual temperature in the bath. Water can be circulated through external apparatus at up to 6 litres per minute. A pneumatic fail-safe system ensures that the heater is switched off if the water level falls below the impeller or if a leak develops in the circuit. For 200/250V 50 Hz single phase supplies. ... ... Each **£36. 0. 0.** *f*

ACCESSORIES

TM-952	**Water bath,** internal dimensions 18×8¼×8½ in deep, with stainless steel liner	Each **£11. 10. 0.**	*f*
TM-954	**Shelf,** adjustable, 17½×8 in ...	Each **£3. 14. 0.**	*f*
TM-956	**Test tube rack, adjustable,** stainless steel, to take 16 test tubes up to 150×16 mm ...	Each **£3. 15. 0.**	*f*
TM-958	**Constant level device,** for use with TM-952 or any other waterbath or tank, with screw fixing clamp.	Each **£3. 10. 0.**	*f*

TM-940

TM-950

THERMOSTATIC WATER CIRCULATOR

For pumping temperature controlled water and other fluids through external apparatus.
Applications include maintaining constant temperatures for viscosity, spectrophotometry, polarimetry and refractometry measurements, and circulation through water jackets, condensers and constant temperature coils.

OPERATION AND PERFORMANCE

The circulator pumps water in the temperature range 0-80°C up to 5 l/min at no head. Maximum pressure head is 2 metres (7 ft). Temperature fluctuation is of the order ±0·1°C depending upon the thermal capacity of the external system. For optimal temperature control the external thermal load should be maintained more or less constant. The circulator incorporates a cooling coil for operation near or below ambient temperatures.

CONSTRUCTION AND DIMENSIONS

The circulator comprises a 1·7 litre *Pyrex* glass tank with 250W heater, pump, direct reading temperature indicator-controller graduated in °C and °F, and cooling coil.

Overall dimensions
33 × 16·5 × 29 cm high

Net weight
8·6 kg

TM-970

THERMO-CIRCULATOR, *Churchill,* as specification, for 200/240V 50 Hz supplies ... Each **£55. 0. 0.** *m*

TM-970

All items on this page normally available from stock.

Gallenkamp APPARATUS THERMOSTATICALLY CONTROLLED BY THERMO STIRRER OR *Compenstat*

THERMOSTATIC WATER BATH

Thermo Stirrer controlled

A convenient and accurate bath for general laboratory testing and many standard methods including:

IP 49	Penetration of bitumen
IP 60	Specific refractivity
IP 160	Specific gravity and density (by hydrometer)
IP 189	Specific gravity and density (by bicapillary pyknometer)
IP 190	Specific gravity and density (by pyknometer)

Details see WF-850 et seq. in List No. sequence.

BS OVENS

Compenstat controlled

A range of attractive, extremely high performance laboratory drying and sterilising ovens meeting the exacting requirements of BS 2648 and BS 3421.

Operating temperatures up to 250°C maximum can be set on the direct reading *Compenstat* control. A coupled safety thermostat is automatically set 5°C higher to take over should the thermostat fail.

Details see OV-160, OV-420 and OV-440 in List No. sequence.

THERMOSTATIC WATER BATH

Thermo Stirrer controlled

Gallenkamp

An inexpensive, metal bath with stainless steel interior, suitable for many determinations using test tubes or small flasks including various serological and methylene blue and resazurin tests.

Details see WF-360 et seq. in List No. sequence.

ORBITAL INCUBATOR

Compenstat controlled

A precise temperature controlled incubator with powerfully driven orbiting platform for growing cultures of micro-organisms and tissue cells. Applications in microbiology, botany, zoology, virology, bacteriology, biochemistry and metallurgy.

Details see IH-400 et seq. in List No. sequence.

STOPWATCHES

TR-022

TR-025

TR-020

STOPWATCH, general purpose, *Smiths*, recording 30 minutes total, with 60 second dial divided in 0·2 second intervals. Start, stop and reset by consecutive pressures on the winder. Seven jewel lever movement in chromium plated case ... ... Each **£7. 10. 0.** *m*

TR-022

STOPWATCH, general purpose, *Smiths*, as TR-020 but recording 15 minutes with 30 second dial divided in 0·1 seconds ... ... Each **£7. 15. 0.** *m*

TR-025

STOPWATCH, general purpose, *Smiths*, recording 30 minutes total, with 60 second dial divided in 0·2 second intervals. Start and stop by slide movement at the side which enables cumulative readings to be made. Pressure on the winder resets the hands to zero. Seven jewel lever movement in chromium plated case.
Each **£7. 19. 6.** *m*

TR-030

TR-037

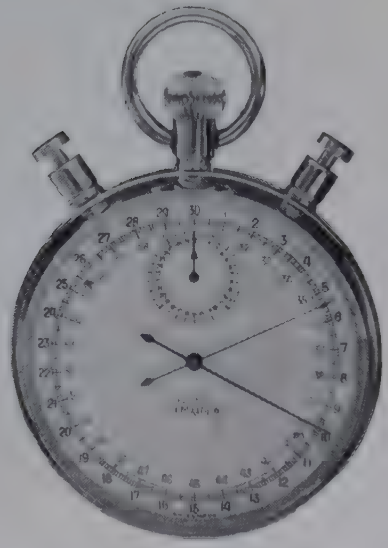
***TR-030**

STOPWATCH, precision, recording 60 minutes total, with three separate dials for minutes, seconds and 0·1 seconds. Start, stop and reset by consecutive pressures on the winder. The 0·1s indicator stops only on the graduations thus facilitating exact readings. Seven jewel, shock resistant lever movement, in chromium plated case.
Each **£9. 19. 6.** *m*

***TR-037**

STOPWATCH, precision, recording 12 minutes total, with three separate dials for minutes, seconds and 0·01 second intervals. Start, stop and reset by consecutive pressures on the winder. The 0·01s indicator stops only on the graduations thus facilitating exact readings. Fifteen jewel, shock resistant movement in water protected chromium plated case ... ... Each **£12. 19. 6.** *m*

TR-040



TR-050

***TR-040**

STOPWATCH, precision, *Venner*, recording 300 seconds total on subsidiary dial and 10 seconds on main dial which is divided in 0·05 second intervals. Hand stops at 0·025 second intervals. Start, stop and reset by consecutive pressures on the winder. Eleven jewel lever movement, in chromium plated case. Each **£16. 12. 6.** *m*

***TR-050**

STOPWATCH, multiple timing, split second with main dial recording 30 seconds subdivided in 0·1 seconds and subsidiary dial recording up to 30 minutes. Rated and calibrated to NPL standards for certification. The watch has two coaxial seconds hands, which can be operated together by the right hand button as on a conventional watch. In addition one hand can be stopped and made to rejoin the other, which runs steadily, by pressing the left hand button. A number of concurrent tests can therefore be timed with one watch. The initial cost and subsequent expenditure on checking and rating is far less than when a number of watches are used, and there is no need to apply corrections for comparative timings as is the case when separate watches are used. The central knob is used to wind the watch and return the hands to zero. With dial cover .... Each **£37. 0. 0.** *mN*

Items on this page normally available from stock except those coded *N*.

TR-060

STOPWATCH HOLDER, with push button operation for start, stop and reset by a simple mechanism which is adjustable for different size watches and which always gives a positive action. Comprises an aluminium die casting finished in hard enamel with polished plated fittings. **Without stopwatch** ... Each **£2. 10. 0.** *m*

TR-060 (with TR-040)

STOPCLOCKS

TR-100

STOPCLOCK, *Smiths*, with two hands recording 60 minutes and 60 seconds on a 10 cm diameter dial. There is a stop and start lever on the left hand side and a reset lever on the right. The clock is spring driven and will run for 30 hours. The dial is protected by a cover glass and the stove-enamelled case has holes for securing to the bench.
Each **£3. 8. 0.** *m*

60
5
10
15
20
25
30
35
40
45
50
55
SECONDS

TR-100

TR-120

STOPCLOCK, *Pye*, with two hands recording 60 minutes total and 60 seconds total respectively, on the 14 cm diameter dial, and with a third index pointer operated by knurled knob in the centre of the glass window. Minute hand set by one control knob while both hands started or stopped by a side lever. Spring driven lever movement which with one winding will run continuously for 30 hours. In plastics case with chromium plated bezel and dial cover, on stainless steel foot for free standing or wall mounting ... Each **£8. 0. 0.** *f*

TR-125

STOPCLOCK, *Pye*, recording 60 seconds total on the main 14 cm diameter dial with a subsidiary dial recording 60 minutes total. Start and stop by side lever movement and reset by depressing a plunger above the main dial. Spring driven lever movement which with one winding will run continuously for 30 hours. In plastics case with chromium plated bezel and dial cover, on stainless steel foot for free standing or wall mounting.
Each **£9. 0. 0.** *f*

60
CAUTION
50
10
40
20
30
PYE

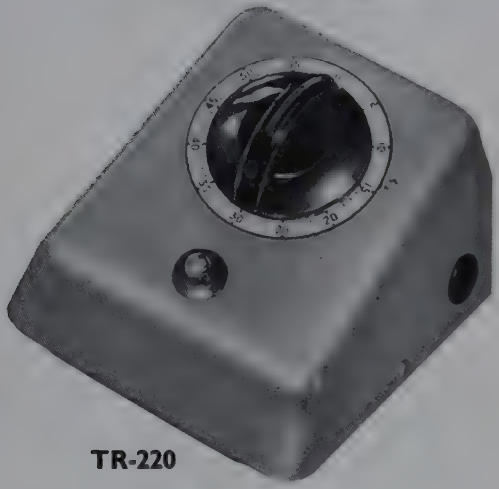
TR-120

WALL CLOCKS see FW-638 and FW-640 in List No. sequence.

All items on this page normally available from stock.

10
9
8
7
6
5
4
3
2
1

TR-165



TR-220

SECONDS
VENNER
PT3

TR-262

MINUTES
VENNER

TR-265

INTERVAL TIMERS

TR-150

INTERVAL TIMER, *Smiths*, for timing any period up to 60 minutes, the end of the period being signalled by a long bell ring. In plastics case with indicating dial which is turned to the required period thereby winding and starting the clock mechanism ... Each **£1. 7. 6.** *m*

TR-160

INTERVAL TIMER, *Smiths*, for timing any period up to 60 minutes, the end of the period being signalled by a long bell ring. The indicator hand is turned to the required period thereby winding the spring driven lever movement and starting the clock. In metal case with 10 cm, diameter dial ... ... Each **£3. 8. 0.** *m*

TR-165

INTERVAL TIMER, *Smiths*, for timing any period from ¼ minute to two hours, the end of the period being signalled by a ten second bell ring. The period required is set by a control knob which moves the minute and second pointers. The spring driven lever movement is wound by one side lever while the other side lever energizes the alarm. One winding enables the clock to run for 30 hours. In metal case with 9 cm diameter dial. Each **£3. 8. 0.** *m*

PROCESS TIMERS

MANUAL ON, AUTOMATIC OFF

TR-220

PROCESS TIMER, spring driven, desk or wall mounting for switching off electrical apparatus after an elapsed time of up to 60 minutes. Incorporates a robust clock mechanism and a 6 cm diameter dial on which the required period is set by turning the central indicator. With indicator lamp and double pole 15A switch, in plastics case, for 200/250V a.c. supplies ... ... Each **£5. 13. 6.** *m*

TR-262

PROCESS TIMER, *Venner*, spring driven, surface mounting, for switching off electrical apparatus after an elapsed time, and, simultaneously, to give visible or audible warning by connection to suitable lamp or bell circuit. Incorporates a spring operated movement with a 7·5 cm square dial on which the required period is set by turning the central indicator to an adjustable stop. With 5A single pole change-over switch for 250V a.c. or 24V d.c. supplies.

Time range	0–60 minutes	0–6 hours	
Each	**£7. 17. 3.**	**£7. 17. 3.**	*m*

TR-265

PROCESS TIMER, *Venner*, electrically driven, surface mounting, for switching off electrical apparatus after an elapsed time. This synchronous motor driven timer is operated by a push button which also indicates elapsed time. The timing interval is set in a lockable pointer. The timer resets automatically after each cycle. With 15A changeover contacts, for 200/250V 50 Hz single phase supplies.

Timing range	0–60 minutes	0–20 hours	0–60 hours	
Each	**£8. 16. 0.**	**£8. 16. 0.**	**£8. 16. 0.**	*m*

All items on this page normally available from stock.

DAILY CYCLE SWITCHES

A time switch provides a convenient means of controlling electrically operated laboratory equipment so that it is switched on and off at regular predetermined times each day. Electrically heated apparatus can be switched on early in the morning so that it has reached operating temperature by the start of the working day. Time switches can also be used as process timers, particularly for periods which are in excess of the 60 minute limit of most process timers.

The following features are common to all models except where otherwise shown:

Self starting synchronous electric motors for operation on 200/250V 50 Hz frequency controlled mains.

24 hour dials divided every ¼ hour.

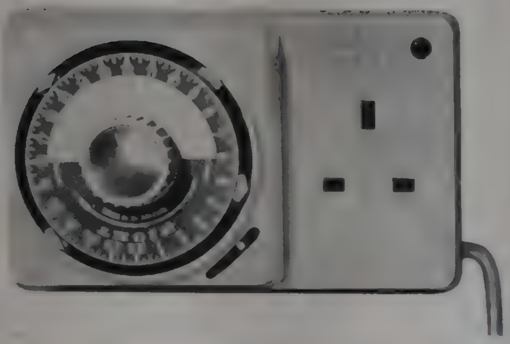
Single pole on/off switches rated at 30 amp, except TR-295 and TR-360 which has 10 amp 2 pole switch.

Minimum switching periods ON/OFF of 30/15 mins except TR-295 which has 45/45 mins, TR-300 60/30 mins and TR-360 15/15 mins.

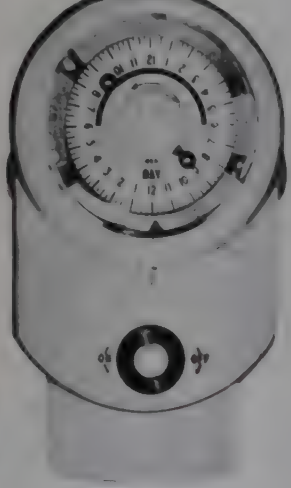
Two pairs of timing levers, each pair providing one ON and one OFF switching every 24 hours, except TR-295 and TR-360 see specifications.

Manual override switch for switching ON or OFF without affecting normal dial operation, except TR-360.

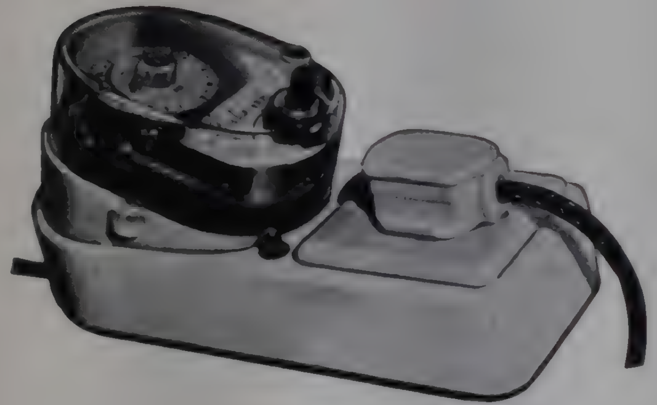
Day selector device (except TR-295, TR-300, TR-330 and TR-360) which permits switching to be omitted on any selected days of the week, e.g. at weekends.



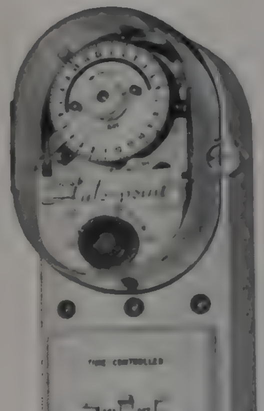
TR-295



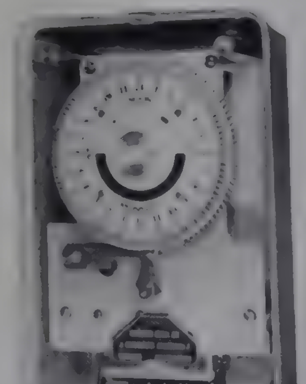
TR-300



TR-330



TR-340



TR-360

TR-295

TIME SWITCH, *Smiths,* **Autoset,** wall or bench mounting, with contacts giving one ON and one OFF period every 24 hours. Suitable for switching loads up to 3 kW. Complete with mains indicator lamp, socket for a 13A plug to BS 1363 and mains cable ... Each **£4. 9. 6.** *m*

TR-300

TIME SWITCH, *Venner,* wall mounting, as specification, in moulded plastics case with transparent push-on cover. Each **£4. 19. 6.** *m*

TR-314

TIME SWITCH, *Venner,* wall mounting, as specification, with day selector device. In diecast metal case with hinged cover ... ... Each **£5. 15. 0.** *m*

TR-330

TIME SWITCH, *Venner* **Autopoint,** portable bench model, as specification, with indicator lamp and 13A 3-pin socket outlet on plastics base with transparent cover and 140 cm mains input cable ... ... Each **£6. 9. 3.** *m*

TR-335

TIME SWITCH, *Venner,* as TR-330 but wall mounting model for permanent installation. Fitted with day selector device ... ... Each **£7. 9. 9.** *m*

TR-340

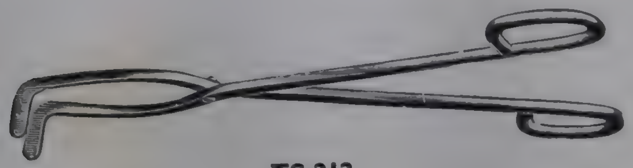
TIME SWITCH, *Venner,* wall mounting model with day selector device, with output **connections for three separate circuits,** one rated at 15A and two at 5A, each with indicator lamp and each separately operated by a 3-position switch giving a choice of permanently ON, time switch operated, or permanently OFF. Each **£10. 16. 6.** *m*

TR-360

TIME SWITCH, *Venner* **Multiset,** wall mounting, for multiple switching by means of 96 tabs at 15 minute intervals round the dial. These tabs are easily raised, when each provides a 15 minute ON period, adjacent raised tabs providing continuous ON periods. The timer is thus very versatile for many laboratory purposes and can provide regular or irregular switching in any multiple of 15 mins throughout the 24 hours. The timer is housed in sheet metal case 27×15×12 cm with glass window in quick release lid ... Each **£12. 10. 0.** *m*

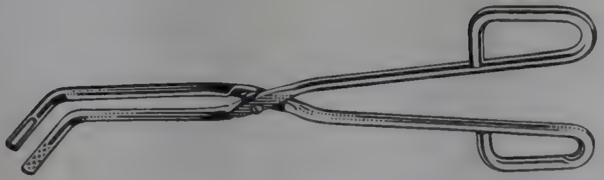
All items on this page normally available from stock.

TONGS


TS-212
TS-214
TS-218

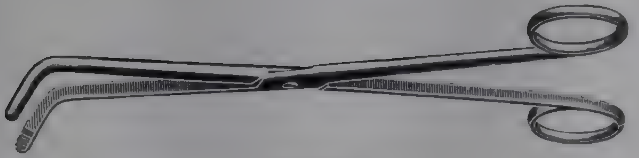
TS-212
TONGS, crucible, blackened steel, with bow, student's pattern. Length 20 cm (longer model without bow see TS-230 below). Dozen **£1.11. 0.** Each **£0. 4. 1.** c

TS-214
TONGS, crucible, brass, with bow and flattened wire hinge. Length 20 cm.
Dozen **£2.12. 0.** Each **£0. 5. 8.** c


TS-216

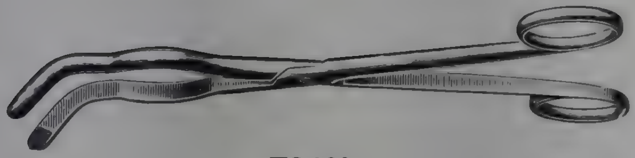
TS-216
TONGS, crucible, stainless steel, straight, with flattened wire hinge. Length 20 cm.
Dozen **£3. 8. 0.** Each **£0. 6.10.** *m*

TS-218
TONGS, crucible, stainless steel, with bow and flattened wire hinge. Length 20 cm.
Dozen **£3. 8. 0.** Each **£0. 6.10.** *m*


TS-220
TS-224

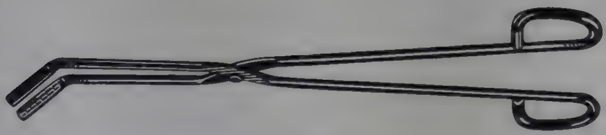
***TS-220**
TONGS, crucible, stainless steel, straight, with forged scissors type hinge. Length 20 cm.
Dozen **£14. 5. 0.** Each **£1. 6. 0.** c

***TS-222**
TONGS, crucible, stainless steel, with bow and forged scissors type hinge. Length 20 cm.
Dozen **£14. 5. 0.** Each **£1. 6. 0.** c

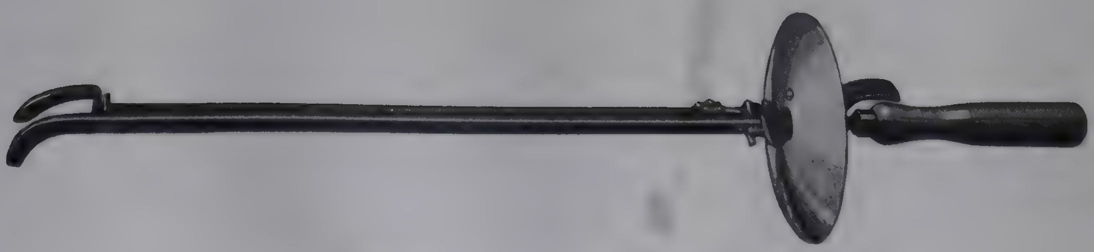

TS-222
TS-226

TS-224
TONGS, crucible, stainless steel as TS-220, fitted with platinum shoes, straight. Length 20 cm.
Each **£12.15. 0.** *m*

TS-226
TONGS, crucible, stainless steel as TS-222, fitted with platinum shoes, with bow. Length 20 cm.
Each **£12.15. 0.** *m*


TS-230

TS-230
TONGS, furnace, blackened steel, straight with flattened wire hinge. Length 38 cm.
Dozen **£3.14. 0.** Each **£0. 7. 4.** c

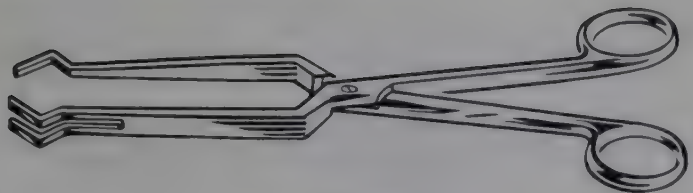

TS-240

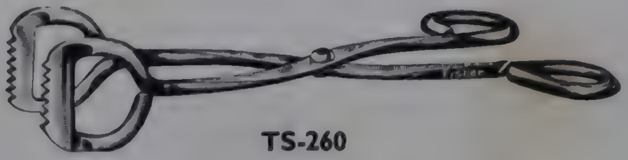
TS-240
TONGS, furnace, Ward pattern, stainless steel, for handling a wide variety of crucibles, etc. especially in tube furnaces. Operated by thumb action with one hand and fitted with a circular shield to protect the hand against radiation from the furnace.

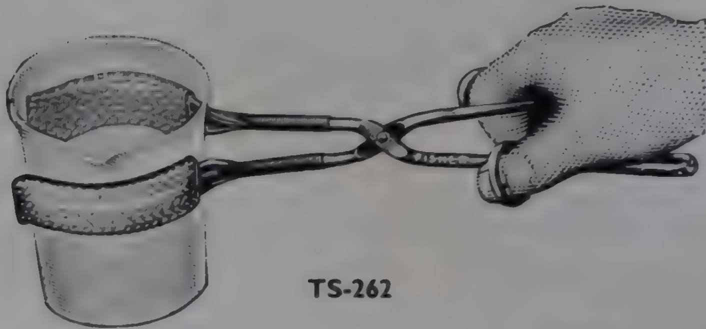
Length to shield	41	56 cm	
	16	22 in	
Overall length	59	74 cm	
	23	29 in	
Each	**£3.10. 0.**	**£3.18. 0.**	c

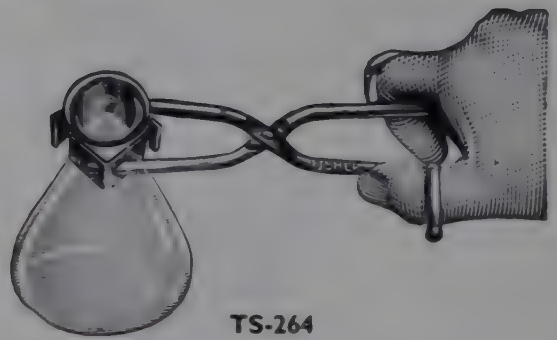
All items on this page normally available from stock.

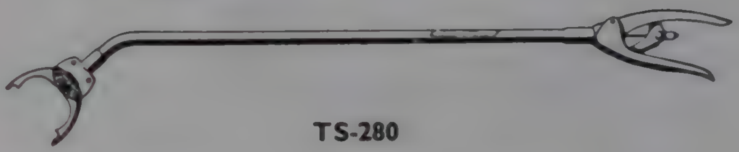
TONGS


TS-250


TS-260


TS-262


TS-264


TS-280

TS-250

TONGS, general purpose, stainless steel. With scissor hinge and finger claws giving a firm but sensitive three point grip, suitable for test tubes, electrodes, thermometers, small flasks and beakers, slides, etc.

Dozen **£14. 15. 0.** Each **£1. 7. 0.** *b*

TS-260

TONGS, *Fisher,* **general purpose,** dull plated mild steel. These tongs have a wide variety of applications and will hold thin pieces of paper, tubes of 10 mm diameter or more or small beakers up to 150 ml. Overall length 19 cm with 2·5 cm serrated jaws.

Pack of 6 **£3. 12. 0.** Each **£0. 13. 9.** *f*

TS-262

TONGS, *Fisher,* **for beakers,** stainless steel. These tongs will firmly grip and safely incline any beaker from 100 to 1500 ml. The 2·5 cm wide jaws are lined with replaceable asbestos covers which prevent slipping and thereby reduce the risk of breakage. Overall length 33 cm ... ... Each **£1. 16. 0.** *f*

TS-263 **Asbestos jaw covers,** replacement for tongs TS-262 Pair **£0. 2. 6.** *f*

TS-264

TONGS, *Fisher,* **for flasks,** stainless steel. These tongs will firmly grip flasks of any shape from 100 to 2000 ml. One of the rectangular V-shaped jaws is smaller than the other ensuring a safe grip. The tong handles extend beyond the finger holds thus ensuring the entire weight of the flask is supported by the palm of the hand.

Overall length 23 cm ... ... Each **£1. 14. 6.** *f*

TS-280

TONGS, REMOTE HANDLING, *Cee-Vee,* a long-arm reacher. The cork-lined jaws are so designed that various sized articles may be picked up safely. Maximum jaw opening 6·3 cm.

Length of arm	75	120	210 cm	
Each	**61/6**	**74/6**	**110/–**	*m*

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories. Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for standard packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'dozen' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about 50/0d. per dozen. This system is intended to encourage ordering in standard packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

All items on this page normally available from stock.

TOOLS

TT-040

TT-040

CLAMPS, 'G', drop forged steel frame, with machine cut square threaded steel screw. Fitted with drop handle and swivel shoe. Opening 10 cm ... Each **£1. 6. 3.** *m*

TT-070

TT-075

TT-070

DRILL, electric, variable speed, with $\frac{3}{8}$ in 3-jaw key chuck and simple finger control to provide speeds continuously variable between 900 and 3000 rev/min. Load 340W. Net weight 1·5 kg. For 230/250V a.c. single phase supplies ... ... Each **£14. 19. 6.** *f*

ACCESSORY

TT-075 **Drill stand,** heavy duty, to accept drill TT-070. With depth control stop. Overall height 75 cm, depth of feed 7 cm, maximum height between chuck and table 50 cm. Each **£6. 19. 6.** *f*

TT-080

TT-080

DRILL BRACE, hand, capacity 0 to $\frac{1}{4}$ in, with double pinion, ball thrust and machine cut gears. In iron frame with polished hardwood handle ... Each **£1. 16. 6.** *m*

TT-082

DRILLS, high speed steel, set of seven $\frac{1}{16}$ to $\frac{1}{4}$ in by $\frac{1}{32}$ in, in metal box ... ... Set **£0. 16. 6.** *m*

TT-110

FILE, round, bastard cut, length 20 cm, with handle. Dozen **£2. 5. 0.** Each **£0. 5. 2.** *m*

TT-112

FILE, three square, second cut, length 15 cm, with handle. Dozen **£2. 9. 0.** Each **£0. 5. 6.** *m*

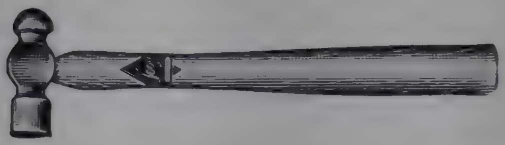
TT-130

TT-130

HACKSAW, adjustable tubular frame for 9 to 12 in blades ... ... Each **£0. 17. 0.** *m*

TT-131

BLADES, hacksaw, high speed steel, length 12 in, width 0·5 in, thickness 0·025 in, 24 teeth per inch. Gross **£19. 10. 0.** Dozen **£1. 16. 0.** *m*



TT-150

TT-150

HAMMER, engineers, with ball pein and hickory handle. Weight $\frac{1}{2}$ lb ... ... Each **£0. 9. 9.** *m*

TT-160

TT-160

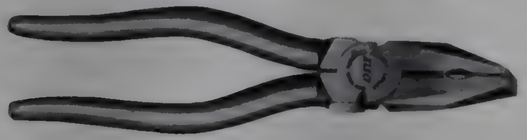
KNIFE, trimming, with 5 cm reversible steel blade rigidly held in a two part diecast alloy handle. With five spare blades inside handle and blade guard. Each **£0. 6. 0.** *m*

All items on this page normally available from stock.

TOOLS

TT-200

TT-200
MIRROR, dental type, 25 mm dia. mirror with anodised aluminium handle, 15 cm long overall.
Dozen **£2. 8. 0.** Each **£0. 5. 4.** *m*


TT-250

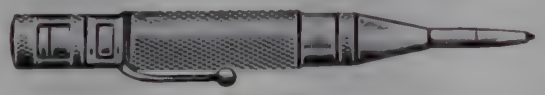
TT-250
PLIERS, combination, with knurled insulated handles, length 17·5 cm ... ... Each **£0. 13. 9.** *m*

TT-254

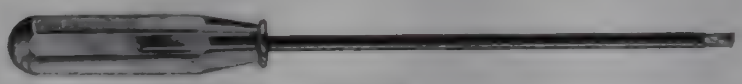
TT-254
PLIERS, snipe nose, insulated handle, length 12·5 cm.
Each **£0. 12. 6.** *m*

TT-256

TT-256
PLIERS, side cutting, length 12·5 cm Each **£0. 15. 6.** *m*


TT-280

TT-280
PUNCH, centre, automatic, with removable point. Impact pressure adjustable from 5 to 30 lb. Length 11 cm, with pocket clip ... ... Each **£0. 16. 0.** *m*


TT-340

TT-340
SCREWDRIVERS, electricians', fully insulated, with plastics handle.

Blade length	7·5	10	15	20 cm	
Blade width	3	3	4	5 mm	
Dozen	**40/–**	**43/–**	**57/–**	**70/–**	*m*
Each	**4/9**	**5/–**	**6/–**	**7/–**	

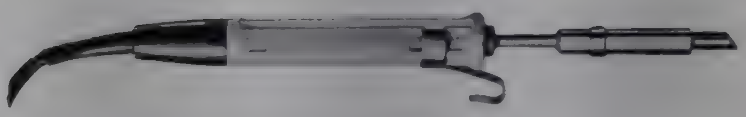
TT-344
SCREWDRIVER, heavy duty, 15 cm blade, 10 mm wide.
Each **£0. 10. 3.** *m*

TT-350
SCREWDRIVERS, Phillips headed, with plastics handle.

Point size	1	2	
Blade length	7·5	10 cm	
Dozen	**60/–**	**78/–**	*m*
Each	**6/4**	**7/8**	

TT-390

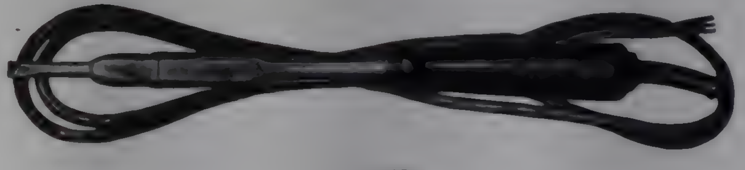
TT-390
SNIPS, tinmans', length 20 cm ... Each **£0. 8. 6.** *m*


TT-420

TT-420
SOLDERING IRON, miniature, 15W, with nickel-plated bit, 4 mm diameter tip. For 220/240V supplies.
Each **£1. 11. 0.** *m*

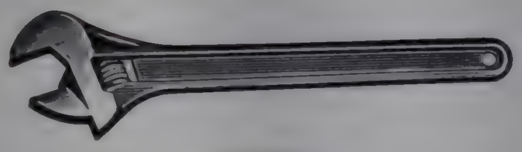
TT-430
SOLDERING KIT, with 15W miniature iron, 3 nickel-plated bits having tip diameters of 2·3, 4 and 4·7 mm, supply of solder and heat sink in fitted plastics case. For 220/240V supplies ... ... Each **£2. 9. 6.** *m*

REPLACEMENT AND ACCESSORY FOR TT-420 and TT-430
TT-435 **Bits, nickel-plated,** 2·3, 4 and 4·7 mm tip diameters.
Set of 3 **£0. 10. 0.** *m*

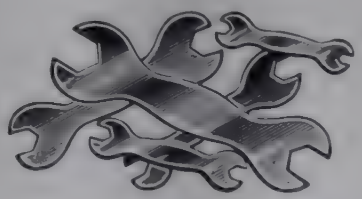

TT-440

TT-440
SOLDERING IRON, 65W, with round pencil bit. For 230/250V supplies ... ... Each **£1. 18. 8.** *m*

TT-450
SOLDER, 'Multicore,' Ersin cored, non-corrosive, for electrical use, 60/40 tin/lead 18 swg. In carton.
Each **£0. 5. 0.** *m*


TT-500

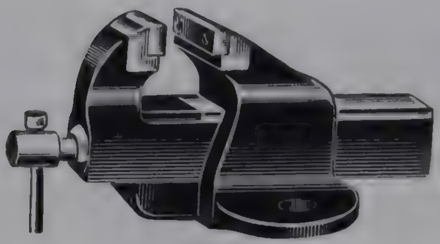
***TT-500**
SPANNER, adjustable, 15° angled head. Length 150 cm, jaw maximum opening 20 mm. Each **£0. 14. 6.** *m*


TT-510

TT-510
SPANNERS, B.A., tempered pressed steel, set of six, range 0 to 11 B.A.
Dozen sets **£2. 0. 0.** Set **£0. 4. 9.** *m*

All items on this page normally available from stock.

TOOLS


TT-550

TT-550

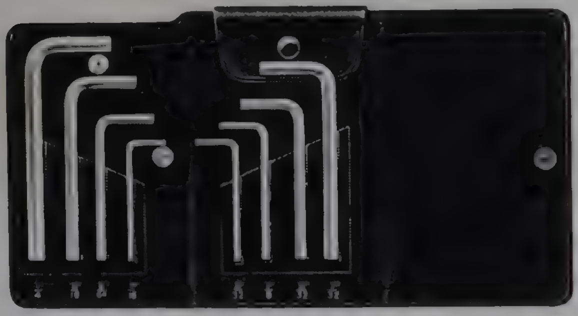
VICE, bench, plain screw type, with interchangeable hardened steel jaw plates; jaw width 8·5 cm, opening 10 cm ... ... Each **£3. 9. 4.** *m*

TT-560

TT-560

WIRE CUTTER STRIPPER, preset to avoid damage to conductor when stripping insulation.

Dozen **£2. 2. 0.** Each **£0. 4.11.** *m*


TT-575

TT-575

WRENCHES, hexagon socket screw, set of eight in plastics case, $\frac{1}{16}$ to $\frac{1}{4}$ in A/F, for set screws 5 B.A. to $\frac{1}{2}$ in dia., and for cap screws 6 B.A. to $\frac{5}{16}$ in dia.

Dozen **£3.14. 0.** Each **£0. 7. 4.** *m*

Other useful 'Tools' as tabulated below will be found in List No. sequence.

BLOWPIPES	see	BR-150 to BR-240
BRUSHES	see	BU-430 to BU-680
FORCEPS	see	DR-010 to DR-050
GLASSBLOWING	see	GP-100 to GP-200
LIGHTERS	see	LV-020 and LV-030
MAGNIFIERS	see	MA-660 to MA-900
MEASURES	see	MB-860 to MB-920
PENCILS	see	PC-910 to PC-984
PLASTICS WELDING	see	PP-770 and PP-780
PRESSES	see	PU-020 to PU-202
RULES	see	RX-021 to RX-105
SCISSORS	see	DR-320 to DR-342 and SB-620 to SB-622
SPATULAS	see	SJ-050 to SJ-400
TACHOMETERS	see	TB-020
TEST PROD	see	EB-770
TUBE EXPANDER	see	TX-900 and TX-910

TT-600

TT-610

TOOL KITS

TT-600

TOOL KIT, instrument and electronic, comprising one each of the following tools in a plastics roll.

BU-615	Brush, dusting 12·5 mm	
DR-032	Forceps, stainless steel, 12·5 cm	
EB-770	Test prod with neon indicator lamp	
TT-200	Mirror, dental type	
TT-254	Pliers, snipe nose	
TT-256	Pliers, side cutting, 12·5 cm	
TT-340	Screwdriver, 1 each sizes 7·5, 10 and 15 cm	
TT-350	Screwdriver, Phillips, 7·5 cm	
TT-420	Soldering iron, 15W 220/240V	
TT-510	Spanners, BA, set of six	
TT-560	Wire stripper	Kit **£6. 0. 0.** *m*

TT-610

TOOL KIT, laboratory workshop, in strong metal case with carrying handle and provision for padlocking. Small tools can be placed in a removable tray. Tool kit TT-600 can be carried inside. Comprises one each of the following tools:—

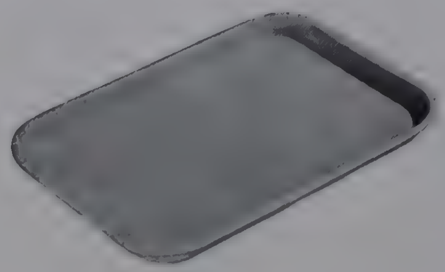
TT-080	Drill brace	
TT-082	Set of drills	
TT-110	File, round	
TT-112	File, 3-square	
TT-130	Hacksaw	
TT-131	Dozen blades	
TT-150	Hammer	
TT-160	Trimming knife	
TT-250	Pliers, combination	
TT-280	Centre punch	
SB-620	Scissors, 12·5 cm	
TT-340	Screwdriver, 20 cm	
TT-344	Screwdriver, 15 cm	
TT-350	Screwdriver, Phillips, 10 cm	
TT-390	Snips	
TT-440	Soldering iron, 65W supplied for 230/250V unless otherwise specified	
TT-500	Spanner, adjustable	
RX-055	Rule, 10 in	
RX-060	Measure, 2 metres	
TT-575	Set of hexagonal wrenches	Kit **£16.10. 0.** *m*

All items on this page normally available from stock.

TRAYS

TU-515

TRAY, rigid polystyrene, white, 43 × 33 × 2·5 cm deep ... ... Each **£0.15. 0.** *c*

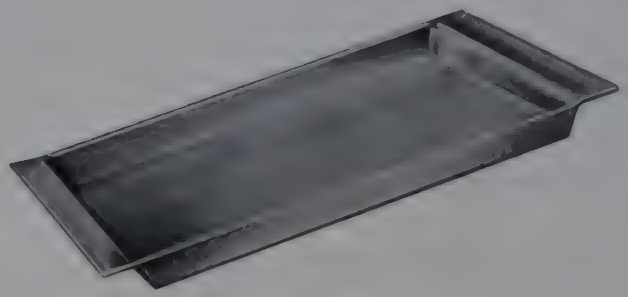


TU-515

TU-520

TRAYS, rigid polythene, with end handles. Easily cleaned and corrosion resistant. Will withstand 105°C.

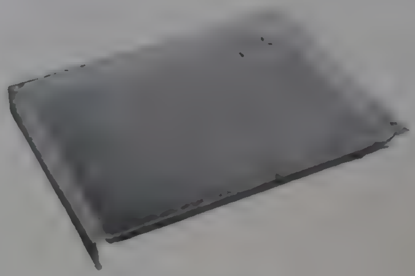
Size	42×22×2·2	57×41×1·6 cm	
Each	**£1.17. 6.**	**£3. 3. 0.**	*m*



TU-520

TU-532

TRAY, mercury, rigid polythene, with drain hole and plug. Dimensions 41×32×2 cm ... Each **£2.16. 0.** *m*



TU-532

TU-540

TRAYS, translucent silica, suitable for *Gallenkamp* muffle furnaces, with rim on three sides.

Dimensions	67×114	118×175	152×248 mm	
For muffle	5×6	6×9¼	7½×15 in	
Lots of 10	**222/-**	**411/-**	**781/-**	*m*
Each	**24/10**	**45/11**	**86/11**	

TU-540

BT-640 TRAYS, bottle
DM-240, DM-250 TRAYS, developing
DM-260, DM-265 TRAYS, dissecting
HJ-600 TRAYS, slide washing

For details see entries in List No. sequence.

TRIANGLES

TV-540

TRIANGLES, iron wire, covered with pipe clay tubes.

Side of triangle	39	50	63	76 mm	
Gross	**118/-**	**118/-**	**140/-**	**160/-**	*c*
Dozen	**10/9**	**10/9**	**12/9**	**14/6**	

TV-560

TRIANGLES, nickel-chromium wire, covered with *Vitreosil* silica tubes.

Side of triangle	39	50	63	76 mm	
Lots of 10	**34/-**	**34/-**	**46/-**	**58/-**	*m*
Each	**4/10**	**4/10**	**6/-**	**7/-**	

TV-570

TRIANGLES, *Vitreosil* translucent silica, components fused together.

Side of triangle	50	63 mm	
Lots of 10	**136/-**	**156/-**	*m*
Each	**14/9**	**17/6**	

DK-550

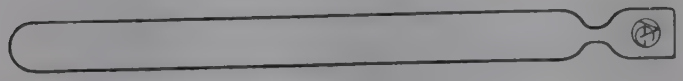
TRIANGLES, glass for desiccators. For details see entry in List No. sequence.

TV-540
TV-560

TV-570

All items on this page normally available from stock.

COMBUSTION TUBES



TW-430

TW-430

TUBES, Carius, soda-lime glass, for sealed tube reactions. With heavy wall capable of withstanding necessary pressures at temperatures up to 300°C. Wall thickness 2 to 2·5 mm, overall length 60 cm, closed at one end and constricted at the other end.

External diameter	14 to 16	24 to 26 mm	
Dozen	**82/–**	**155/–**	*a*
Each	**7/10**	**14/–**	

MK-410

TUBES, micro-Carius. See entry in List No. sequence.

TW-480

TUBES, combustion glass, suitable for temperatures up to 700°C. Wall thickness 1·5 mm; length 30 cm, open both ends.

Internal diameter	16	19	25 mm	
Dozen	**45/–**	**57/–**	**83/–**	
Each	**5/2**	**6/–**	**8/–**	*m*

TW-484

TUBES, combustion, transparent silica for use up to 1000°C. Length 450 mm.

Internal diameter	9	15	19 mm	
Wall thickness approx.	1·0	1·2	1·2 mm	
Dozen	**125/–**	**190/–**	**265/–**	c
Each	**11/3**	**17/6**	**24/–**	

TW-488

TUBE, combustion, transparent silica, length 127 cm × 15 mm internal diameter.

Dozen **£16. 10. 0.** Each **£1. 10. 0.** c

MK-400

TUBES, micro-combustion. See entry in List No. sequence.

FURNACE WORK TUBES

The ranges listed below to suit *Gallenkamp* furnaces are normally available from stock. Tubes of other sizes or materials are available to order.

Refractory tubes other than fused silica are sensitive to thermal shock and care should be taken to avoid unnecessarily rapid temperature changes, particularly with the less resistant materials.

TW-490

TUBES, FURNACE WORK, translucent silica, for use up to 1050°C with inert or oxidising atmospheres. These tubes have very high thermal shock resistance.

Size No.	2	8	
Length	610	660 mm	
External diameter approx.	33	45 mm	
Internal diameter approx.	25	35 mm	
Each	**35/2**	**46/5**	*m*

TW-495

TUBES, FURNACE WORK, impervious aluminous porcelain, for use up to 1500°C with inert or oxidising atmospheres. These tubes have reasonable thermal shock resistance.

Size No.	2	4	8	
Length	600	660	660 mm	
External diameter approx.	32	28·5	46 mm	
Internal diameter approx.	25·5	22·5	38 mm	
Each	**38/3**	**39/9**	**60/9**	*m*

TW-500

TUBES, FURNACE WORK, porous fused alumina, for use up to 1700°C with inert, oxidising or reducing atmospheres. These tubes have high thermal shock resistance.

Size No.	6	10	
Length	675	825 mm	
External diameter approx.	38·5	80 mm	
Internal diameter approx.	28·5	65 mm	
Each	**76/3**	**157/–**	*m*

TW-505

TUBES, FURNACE WORK, impervious fused mullite, for use up to 1700°C with inert or oxidising atmospheres. Also suitable over short periods up to 1000°C with hydrogen but at higher temperatures may become porous. These tubes have moderate resistance to thermal shock.

Size No.	2	4	6	8	10	
Length approx.	600	660	660	660	825 mm	
Ext. dia. approx.	32	28·5	39	46	75 mm	
Int. dia. approx.	25·5	22·5	32	38	65 mm	
Each	**67/6**	**68/6**	**91/6**	**107/–**	**211/–**	*m*

TW-510

TUBE END PLUGS, refractory, to insert into the ends of work tubes TW-500, TW-505 to enable high, uniform temperatures to be obtained without overheating the furnace elements.

For tube size No.	6	10	
Length approx.	114	200 mm	
External diameter approx.	28	61 mm	
Dozen	**82/–**	**120/–**	*m*
Each	**7/10**	**11/–**	

All items on this page normally available from stock.

SPECIMEN TUBES

TW-600

TUBES, specimen, straight sided, clear glass, with polythene push-in closures.

Length	50	50	50	50	75	75	75 mm	
Diameter	10	12	19	25	12	19	25 mm	
Carton qty.	335	220	210	125	220	210	125	
Dozen Cartons	**390/–**	**290/–**	**460/–**	**390/–**	**350/–**	**600/–**	**490/–**	c
Carton	**36/–**	**26/6**	**42/–**	**36/–**	**32/–**	**54/–**	**45/–**	

TW-605

TUBES, specimen, straight sided clear glass with bark corks.

Length	50	50	50	75	75	100 mm	
Diameter	10	12	25	19	25	25 mm	
Pack of 144	**16/–**	**17/6**	**47/–**	**29/–**	**52/–**	**58/–**	c

TW-610

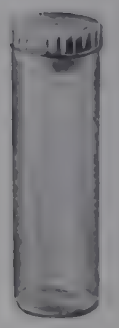
POSTAL BOXES, wooden, for specimen tubes TW-600 or TW-605. Each box accepts one tube.

For tube	75×19	75×25 mm	
Gross	**130/–**	**135/–**	c
Dozen	**11/9**	**12/3**	

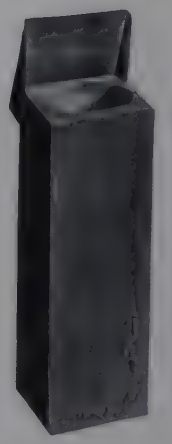
TW-630

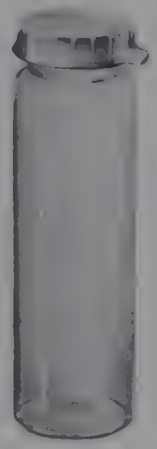
TUBES, specimen, straight sided, clear glass, with polythene snap-on closures. Also suitable for use as weighing tubes.

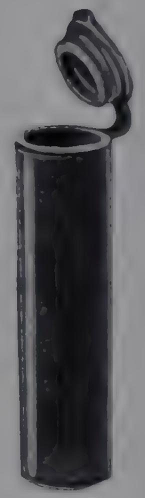
Capacity	5	10	20	30 ml	
Length	25	40	60	70 mm	
Diameter	23	24	25	28 mm	
Std. pack qty.	140	130	110	95	
Std. pack	**33/–**	**34/–**	**38/–**	**40/–**	c
Dozen	**4/3**	**4/6**	**5/8**	**6/4**	


TW-600

TW-605


TW-610


TW-630


TW-650

TW-650

TUBES, specimen, lightweight polythene, with fitted hinged lids. Also suitable for use as small weighing tubes or as counterpoises.

Length	60	75 mm	
Diameter	16	24 mm	
Gross	**36/–**	**74/–**	c
Dozen	**4/6**	**7/4**	

CROSS REFERENCE TO TUBES IN OTHER SECTIONS OF THE CATALOGUE

Absorption	see	AB-600 et seq.
Blood sedimentation	see	MC-670
Centrifuge	see	CJ-005 et seq.
Dairy test	see	DE-250
Drying	see	AB-600 et seq.
Filter	see	FD-540, FD-560 FD-650, FD-660
Haematocrit	see	MC-705, MD-020 and MD-022
Manometer	see	MB-020 to MB-062
Melting point	see	MF-386 and MF-388
Micro-Carius	see	MK-410
Micro-combustion	see	MK-400
Test tubes	see	TF-100 to TF-420

All items on this page normally available from stock.

SODA-LIME GLASS TUBING

MEDIUM WALL

TX-250

TUBING, soda-lime glass medium wall, for general bending and glassblowing work in laboratories. Free from lead and will not devitrify in a blowpipe flame. In standard lengths of approx. 150 cm. The figures in pack qty. column indicate the average number of 150 cm lengths in a pack of approx. 5 kg.

Ext. dia. mm	Wall mm	Pack qty. approx.	Per pack	Per 12 lengths	Per length	
3– 4	0·4 –0·6	297	76/–	4/8	—	c
4– 5	0·5 –0·75	168	64/–	5/10	—	c
5– 6		124	44/–	5/8	—	c
6– 7	0·75–1·0	87	29/–	5/–	—	c
7– 8		71	29/–	6/–	—	c
8– 9		64	29/–	6/8	—	c
9–10		55	29/–	7/4	—	c
10–11		50	29/–	7/10	—	c
11–12		47	29/–	8/3	2/6	c
12–13		43	29/–	9/–	2/6	c
13–14		39	29/–	9/6	2/6	c
14–15		35	29/–	10/3	2/7	c
15–16		32	29/–	11/3	2/7	c
16–18		30	29/–	12/–	2/8	c
18–20		27	29/–	13/3	2/9	c
20–22		24	29/–	15/–	2/11	c
22–24		21	29/–	17/–	3/–	c
24–26		18	29/–	19/6	3/3	c
26–28	1·0 –1·25	15	34/–	—	3/10	c
28–30		13	34/–	—	4/2	c

EXTRA HEAVY WALL

TX-260

TUBING, soda-lime glass, as TX-250 but **extra heavy wall.**

Ext. dia. mm	Wall mm	Pack qty. approx.	Per pack	Per 12 lengths	Per length	
12–14	2·0–2·5	18	43/–	29/–	3/11	c
14–16		16	43/–	32/–	4/2	c

CAPILLARY BORE

TX-265

TUBING, soda-lime glass, as TX-250 but **capillary bore,** suitable for demonstration barometers, thermometers and Sprengel pumps, etc.

Ext. dia. mm	Int. dia. mm	Pack qty. approx.	Per pack	Per 12 lengths	Per length	
5– 6	0·25–0·75	59	150/–	32/–	4/2	c
6– 7	0·75–1·25	44	110/–	32/–	4/2	c
7– 8	1·75–2·25	36	86/–	30/–	4/–	c
9–10	2·75–3·25	25	86/–	43/–	5/–	c

NOTE: All glass tubing prices apply to tubing in standard lengths. Tubing may be cut to shorter lengths at extra cost depending on size, finish required, wastage and length tolerance. Quotations on receipt of details.

GENERAL PROPERTIES OF BOROSILICATE AND SODA-LIME GLASSES

Borosilicate glass has good resistance to thermal shock and can be worked in a blowpipe flame using gas together with compressed air enriched with oxygen. After working it should be annealed in a furnace at 565 to 570°C for 15 minutes then allowed to cool slowly and uniformly no faster than 200°/hour to below 150°C.

Soda-lime glass can be worked in a Bunsen or gas/air burner flame without devitrification. It should be annealed; the technique of cooling in a luminous flame until carbon is deposited is adequate but furnace annealing at 515 to 520°C followed by slow cooling is preferable.

Both types of glasses have excellent chemical resistance, borosilicate being slightly less alkali resistant but more acid resistant than soda-lime glass.

TECHNICAL DATA

TYPICAL CHEMICAL ANALYSIS

Component	Composition	
	Borosilicate	Soda-lime
Silica	80·6%	71%
Boric oxide	12·6%	—
Sodium oxide	4·15%	15%
Aluminium oxide	2·2%	2·2%
Calcium oxide	0·1%	5·7%
Magnesium oxide	0·05%	2·9%
Barium oxide	5 ppm	1·7%
Potassium oxide	—	1·2%

PHYSICAL PROPERTIES

Property	Borosilicate	Soda-lime
Expansion coefficient	$3·3\times10^{-6}$ per °C	$9·2\times10^{-6}$ per °C
Specific gravity	2·23 gm/cm³	2·50 gm/cm³
Refractive index (n_D)	1·475	1·513
Strain point	520°C	475°C
Annealing point	565°C	515°C
Softening point	820°C	710°C

All items on this page normally available from stock.

BOROSILICATE GLASS TUBING

LIGHT WALL

TX-280

TUBING, *Pyrex brand,* **borosilicate glass, light wall.** In standard lengths of 150 cm approx. The figures in std. pack qty column indicate the number of 150 cm lengths in a standard pack.

Ext. diam. mm		Wall mm	Std. pack qty	Std. pack	Per 12 lengths	Per length
4	±0·5	0·75±0·25	360	243/–	9/6	2/6
5			260	214/–	10/9	2/7
6		1±0·25	240	270/–	15/–	2/11
7			200	255/–	17/–	3/–
8			180	243/–	18/6	3/2
9			150	214/–	18/–	3/1
10			132	198/–	20/–	3/3
11			120	189/–	20/6	3/4
12			108	186/–	22/6	3/5
13			100	195/–	25/6	3/8
14			76	154/–	26/6	3/9
15		1·25±0·25	68	183/–	34/–	4/4
16			64	187/–	38/–	4/7
17			60	189/–	40/–	4/9
18			56	189/–	44/–	5/–
19			52	183/–	44/–	5/–
20			52	195/–	47/–	5/4
21			48	191/–	—	5/6
22			44	181/–	—	5/8
23			44	191/–	—	5/10
24			40	180/–	—	5/10
25			40	189/–	—	6/2
26	±1		40	198/–	—	6/4
28			32	170/–	—	6/8
30		1·5±0·25	32	218/–	—	8/–
32			20	145/–	—	8/6
34			20	156/–	—	9/–
36			20	165/–	—	9/3
38			20	175/–	—	9/9
40			15	138/–	—	10/3
42		$1{\cdot}75^{+0{\cdot}5}_{-0{\cdot}25}$	15	169/–	—	12/6
44			15	176/–	—	13/1
46			15	184/–	—	13/8
48			15	193/–	—	14/4
50			15	197/–	—	14/7
52			4	51/–	—	15/7
54			4	58/–	—	16/2
56			4	60/–	—	16/10
59	±1·5	$2{\cdot}25^{+0{\cdot}5}_{-0{\cdot}25}$	4	81/–	—	22/7
62			4	86/–	—	23/10
65			4	90/–	—	25/–
68			4	94/–	—	26/2
71			4	98/–	—	27/5
74		2·5±0·5	4	114/–	—	31/8
77			4	119/–	—	33/–
80			4	123/–	—	34/4

MEDIUM WALL

TX-285

TUBING, *Pyrex brand* **borosilicate glass,** as TX-280 but **medium wall.** In lengths of 150 cm approx.

Ext. diam. mm		Wall mm	Std. pack qty	Std. pack	Per 12 lengths	Per length
6	±0·5	1·5±0·25	150	202/–	25/–	3/8
7			140	220/–	21/–	3/4
8			115	207/–	23/–	3/6
9			100	195/–	25/6	3/8
10			90	182/–	26/–	3/8
11			75	174/–	30/–	4/–
12			70	178/–	33/–	4/3
13			65	180/–	35/–	4/5
14			55	169/–	39/–	4/8
15		1·75±0·25	45	169/–	—	5/4
16			45	179/–	—	5/6
17			40	168/–	—	5/8
18			36	162/–	—	6/–
19			36	173/–	—	6/4
20			32	163/–	—	6/6
21			32	173/–	—	6/10
22			32	180/–	—	7/–
23			32	189/–	—	7/2
24			28	174/–	—	7/6
25			25	172/–	—	8/3

CAPILLARY BORE

TX-290

TUBING, *Pyrex brand* **glass,** as TX-280 but **capillary** bore. In lengths of 150 cm approx.

Ext. dia. mm	Internal dia. mm	Std. pack qty No. of lengths	Std. pack	Per 12 lengths	Per length
4–6	0·25–0·75	120	117/–	12/9	2/8
5–7	0·5–1·0	85	121/–	18/6	3/2
6–8	0·75–1·25	65	127/–	24/6	3/7
6–8	1·25–2·0	65	117/–	22/6	3/5
6–8	2·0–2·0	65	112/–	21/6	3/4
7–9	1·5–2·5	50	120/–	31/–	4/1
8–10	2·5–3·5	40	114/–	35/–	4/5

For technical data on borosilicate and soda-lime glasses see facing page.

All glass tubing prices apply to tubing in standard lengths. Tubing may be cut to shorter lengths at extra cost depending on size, finish required, wastage and length tolerance. Quotation on receipt of details

All items on this page normally available from stock (code *d*).

FLEXIBLE TUBINGS

PROPERTIES OF ELASTOMERIC MATERIALS

Until recent years the only material with a high degree of elasticity at normal ambient temperatures available for laboratory purposes was natural rubber.

Lately, resulting from the development of 'synthetic rubbers' and plastics materials the range of **elastomers** available for such items as laboratory tubing and stoppers has been increased substantially. The properties of the more common materials are listed below. In catalogue entries where the unqualified term **Rubber** is used, it may be assumed that the item is made of natural rubber.

To facilitate the recognition of elastomeric materials used for the manufacture of *Gallenkamp* **stoppers and tubings**, these items are **colour coded** as follows.

Butyl rubber	Black
Natural rubber (latex)	Translucent amber
Natural rubber (filled)	Red
Neoprene	Grey
PVC	Transparent colourless
Silicone	Translucent-opalescent

Exceptions to this code are TX-625, canvas reinforced natural rubber pressure tubing and TX-770, PVC tubing for gas analysis purposes.

GENERAL PROPERTIES OF COMMON ELASTOMERS

Type of elastomer	Appearance and notable features	Maximum service temperature °C approx.	Sterilization		Attacking reagents	
			Air at 160°C	Steam at 121°C	Acids and alkalis	Common organic solvents
Butyl rubber (isobutylene-isoprene)	Filled and pigmented. Very low gas permeability	110	No	No	None	Esters, chlorinated hydrocarbons
Natural rubber (natural polyisoprene)	Translucent (latex) or filled and pigmented	70	No	Some grades	Conc. oxidising acids	Aliphatic, aromatic and chlorinated hydrocarbons, esters, ketones and ethers
Neoprene (polychloroprene)	Filled and pigmented	120	No	No	Conc. oxidising acids	Aromatic and chlorinated hydrocarbons, esters and ketones
Nitrile rubber (styrene acrylonitrile)	Filled and pigmented	130	No	Yes	Conc. oxidising acids	Chlorinated hydrocarbons, esters and ketones
PVC (plasticised vinyl)	Transparent or pigmented. Low gas permeability	50	No	Some grades	None	Ketones, cyclic ethers, esters and chlorinated hydrocarbons
Silicone rubber	Translucent. Very flexible	250	Yes	Yes	Strong alkalis	Esters

NOTE: This table is of a general nature; the properties of certain individual formulations may differ from those quoted.

RECOMMENDED TUBINGS FOR SPECIAL PURPOSES

COMPRESSED AIR	TX-625, TX-778
GAS ANALYSIS APPARATUS	TX-500, TX-770
GASES	
Fuel gas, coal	TX-520, TX-635, TX-750, TX-780
Fuel gas, LPG	TX-500
Fuel gas, natural (methane)	TX-500
Inert gases (from cylinders fitted with pressure regulators)	TX-625, TX-778
PERISTALTIC PUMPS	TX-800
VACUUM	
Low, filter pumps, etc.	TX-525, TX-772, TX-774
High, oil filled pumps	TX-755, TX-778
WATER	
At mains pressures	TX-625, TX-778
At low pressures	TX-525, TX-755, TX-772, TX-774

BRITISH STANDARD 2775

BS 2775 was prepared in order to specify the important physical properties and to rationalise the sizes of laboratory stoppers and elastomeric tubings. Two ranges of wall thicknesses of tubings are tabulated which will be found adequate for most applications, normal wall (N) and heavy wall (H). Wherever possible the tubings listed conform to the requirements of this Standard.

Normal wall range

Designation	N3	N5	N6·5	N8	N10
Int. dia.	3	5	6·5	8	10 mm
Wall	0·75	1·5	1·5	2	2 mm
Designation	N12·5	N16	N20	N25	
Int. dia.	12·5	16	20	25	
Wall	2·25	3·25	3·25	3·25 mm	

Heavy wall range

Designation	H3	H5	H6·5	H8	H10	H12·5
Int. dia.	3	5	6·5	8	10	12·5 mm
Wall	3	4	5	6	7	8·5 mm

FLEXIBLE TUBINGS

(continued)

BUTYL RUBBER

TX-500

TUBING, butyl rubber, black. A very low gas permeability tubing particularly suitable for precision gas analyses where changes in gas composition due to diffusion through the tubing are to be minimal. Also suitable for use with natural gas (methane). To BS 2775. Coil of 20 metres (22 yds).

Designations	—	N3	N5	N6·5	N8	
Int. dia.	1·5	3	5	6·5	8 mm	
Wall	0·5	0·75	1·5	1·5	2 mm	
Coil	**25/–**	**31/–**	**40/–**	**44/–**	**60/–**	c
Metre	**2/11**	**3/2**	**3/7**	**3/9**	**4/6**	

NATURAL RUBBER

TX-520

TUBING, natural rubber, red, **normal wall,** to BS 2775. Coil of 20 metres (22 yds).

Designation	N3	N5	N6·5	N8	N10	
Int. dia.	3	5	6·5	8	10 mm	
Wall	0·75	1·5	1·5	2	2 mm	
Coil	**17/–**	**24/–**	**27/6**	**34/–**	**42/–**	c
Metre	**2/7**	**2/11**	**3/–**	**3/4**	**3/8**	

Designation	N12·5	N16	N20	N25	
Int. dia.	12·5	16	20	25 mm	
Wall	2·25	3·25	3·25	3·25 mm	
Coil	**54/–**	**98/–**	**135/–**	**160/–**	c
Metre	**4/3**	**6/4**	**8/–**	**9/–**	

TX-525

TUBING, natural rubber, red, **heavy wall,** to BS 2775. Coil of 20 metres (22 yds).

Designation	H3	H5	H6·5	H8	H10	H12·5	
Int. dia.	3	5	6·5	8	10	12·5 mm	
Wall	3	4	5	6	7	8·5 mm	
Coil	**34/–**	**60/–**	**96/–**	**130/–**	**175/–**	**240/–**	c
Metre	**3/4**	**4/6**	**6/2**	**7/8**	**9/9**	**13/3**	

TX-600

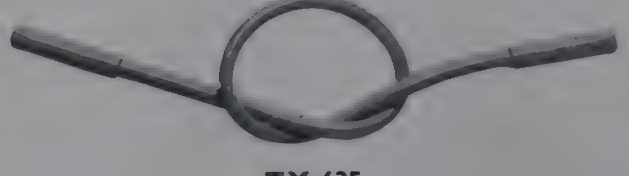
TUBING, natural rubber, (latex) translucent amber, **normal wall,** extremely elastic with very smooth bore. Sulphur free, has good ageing properties and can be repeatedly sterilized at 121°C. Dimensions are to BS 2775. Coil of 20 metres (22 yds).

Designation	N3	N5	N6·5	N8	N10	
Int. dia.	3	5	6·5	8	10 mm	
Wall	0·75	1·5	1·5	2	2 mm	
Coil	**40/–**	**60/–**	**70/–**	**114/–**	**118/–**	c
Metre	**3/7**	**4/6**	**5/–**	**7/–**	**7/2**	

TX-625

TUBING, natural rubber, thick wall, reinforced with canvas. To BS 924 Part 1, suitable for working pressures up to at least 150 lbf/in² (10·5 kgf/cm²).

Int. dia. nominal	6	10	13	16 mm	
Int. dia.	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$ in	
Ext. dia.	$\frac{19}{32}$	$\frac{23}{32}$	$\frac{7}{8}$	$1\frac{1}{16}$ in	
No. of plies	3	3	4	5	
Coil (60 feet)	**130/–**	**145/–**	**190/–**	**235/–**	c
Yard	**7/10**	**8/6**	**10/6**	**13/3**	



TX-635

TX-635

GAS BURNER TUBES, natural rubber, red, with reinforced ends for fitting to Bunsen burner and gas tap tubulures. External diameter 8·5 mm, length 60 cm.
Dozen **£2. 6. 0.** Each **£0. 5. 2.** c

NEOPRENE

TX-750

TUBING, neoprene, grey, **normal wall.** Free from sulphur. To BS 2775. Coil of 20 metres (22 yds).

Designation	N5	N6·5	N8	N10	N12·5	
Int. dia.	5	6·5	8	10	12·5 mm	
Wall	1·5	1·5	2	2	2·25 mm	
Coil	**28/–**	**34/–**	**49/–**	**60/–**	**80/–**	c
Metre	**3/1**	**3/4**	**4/–**	**4/6**	**5/6**	

TX-755

TUBING, neoprene, grey, **heavy wall.** Free from sulphur. To BS 2775.

Designation	H3	H5	H6·5	H8	H10	H12·5	
Int. dia.	3	5	6·5	8	10	12·5 mm	
Wall	3	4	5	6	7	8·5 mm	
Coil length	20	20	20	20	20	10 metres	
Coil	**48/–**	**86/–**	**125/–**	**175/–**	**245/–**	**190/–**	c
Metre	**4/–**	**5/10**	**7/6**	**10/–**	**13/9**	**21/–**	

PVC (VINYL)

TX-770

TUBING, PVC (vinyl), opaque green. With smooth internal bore and low gas permeability making it especially suitable for use where contamination cannot be tolerated as in blood gas determinations, etc. Recommended for use with Van Slyke's apparatus. Internal diameter 6·35 mm, wall thickness 3·2 mm. Coil of 30 metres (100 ft).
Coil **£4. 17. 6.** Metre **£0. 4. 10.** *m*

TX-772

TUBING, PVC (vinyl), colourless, transparent, normal wall. Non-toxic and of great durability. Can be steam sterilized at 125°C. Suitable for medical and biological applications. Dimensions to BS 2775.

Designation	N3	N5	N6·5	N8		
Int. dia.	3	5	6·5	8	mm	
Wall	0·75	1·5	1·5	2	mm	
Coil length	30	30	30	30	metres	
Coil	**16/–**	**36/–**	**44/–**	**70/–**		c
Metre	**2/6**	**2/11**	**3/2**	**3/11**		

Designation	N10	N12·5	N16	
Int. dia.	10	12·5	16 mm	
Wall	2	2·25	3·25 mm	
Coil length	30	10	10 metres	
Coil	**84/–**	**41/–**	**54/–**	c
Metre	**4/5**	**5/6**	**6/8**	

For properties of elastomers and recommendations of tubings for particular uses see page 780.

All items on this page normally available from stock.

FLEXIBLE TUBINGS

(continued)

(PVC) VINYL

continued

TX-774

TUBING, PVC (vinyl), colourless, transparent. Slightly less elastic than TX-772.

Int. dia.	6	8	10	12	18	25 mm	
Wall	1	1·5	2	2	2·5	3 mm	
Coil length	30	30	30	10	10	10 metres	
Coil	**16/6**	**33/–**	**54/–**	**22/–**	**40/–**	**66/–**	c
Metre	**2/6**	**2/10**	**3/6**	**3/9**	**5/4**	**7/10**	

TX-778

TUBING, PVC, colourless, transparent with terylene mesh reinforced wall. A flexible tubing of great inherent strength. Suitable for high pressure or vacuum applications.

Int. dia.	5	6·5	8	10 mm	
Wall	2·5	3	3	3·5 mm	
Coil length	30	30	30	30 metres	
Coil	**96/–**	**145/–**	**155/–**	**205/–**	c
Metre	**4/9**	**6/4**	**6/8**	**8/3**	

Int. dia.	13	16	20 mm	
Wall	3·5	4	4 mm	
Coil length	10	10	10 metres	
Coil	**84/–**	**106/–**	**130/–**	c
Metre	**9/3**	**11/6**	**14/3**	

TX-780

TUBING, PVC with wall reinforced with steel wire spiral. This tubing is very flexible, is crush resistant and will not kink, thus reducing hazards. Suitable for large gas burners and larger pieces of gas operated equipment. Approx. 7 mm bore. Requires end connectors TX-782. Coil of 10 metres (11 yds).

Coil **£1.13. 0.** Metre **£0. 4. 9.** c

ACCESSORY

TX-782 End connectors, neoprene, fluted internally one end for gas tight connection to tubing TX-780.

Dozen pairs **£1. 9. 6.** Pair **£0. 4. 0.** c

SILICONE RUBBER

TX-800

TUBING, silicone rubber, translucent normal wall, extremely elastic. Non-toxic, will withstand storage in tropical conditions and repeated sterilisation both in steam at 121°C or air at 160°C. Suitable for medical and biological application and for use in peristaltic pumps. Dimensions to BS 2775. Coil of 20 metres (22 yds).

Designation	N3	N5	N6·5	N8	
Int. dia.	3	5	6·5	8 mm	
Wall	0·75	1·5	1·5	2 mm	
Coil	**57/–**	**185/–**	**240/–**	**350/–**	c
Metre	**4/5**	**10/3**	**13/6**	**19/6**	

OTHER PLASTICS TUBINGS

TX-825

TUBING, acrylic (PMM), transparent, seamless. In standard lengths of 6 ft (180 cm).

Ext. dia.	¼	⅜	½	¾	1 in	
Int. dia.	5/32	¼	⅜	½	¾ in	
Per 6 feet	**8/6**	**10/9**	**12/–**	**16/–**	**22/–**	m
Per foot	**3/–**	**3/4**	**3/6**	**4/1**	**5/–**	

Ext. dia.	1¼	1½	2	3	4 in	
Int. dia.	1	1¼	1¾	2½	3½ in	
Per 6 feet	**25/–**	**36/–**	**56/–**	**150/–**	**180/–**	m
Per foot	**5/6**	**7/–**	**10/–**	**26/6**	**32/–**	

AE-200

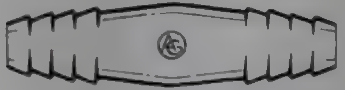
ADHESIVE suitable for above tubing. For details and price see entry in List No. sequence.

TX-835

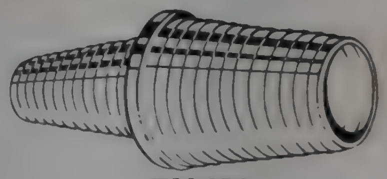
TUBING, polythene, natural grade, medium wall. A tough flexible but inelastic tubing. In coil of 30 metres (100 ft).

Int. dia.	1·5	3·0	4·5	6·3	8·0	12·5 mm	
Wall	1·5	1·5	1·5	1·5	1·5	2·0 mm	
Coil	**8/–**	**14/–**	**17/–**	**20/–**	**24/–**	**54/–**	c
Metre	**2/6**	**2/6**	**2/6**	**2/6**	**2/6**	**3/6**	

TUBING CONNECTORS



TX-850



TX-854

TX-850

TUBING CONNECTOR, Ⓐ**, glass,** for joining two pieces of flexible tubing of similar or differing bores. Consists of a length of glass tubing with tapered, moulded corrugations at each end to accept 5 to 12 mm bore tubings.

Dozen **£1.13. 0.** Each **£0. 4. 3.** a

TX-854

TUBING CONNECTORS, nylon, for joining different sizes of flexible tubing. A moulding with corrugated conical ends to accept tubing.

Size	Minimum inside dia. mm	Minimum outside diameter		Length mm	Each	
		Small end mm	Large end mm			
1	3	4	7	53	2/6	m
2	3	4	9	55	2/7	m
3	5	7	10	57	2/9	m
4	8	10	13	63	3/–	m
6	11	13	19	67	3/9	m

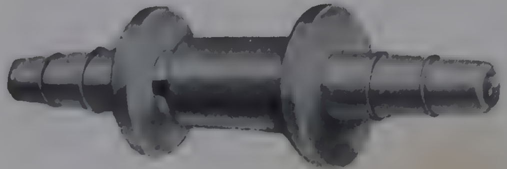
All items on this page normally available from stock.

TUBING CONNECTORS
(continued)

TX-858

TUBING CONNECTORS, push-fit, polythene, for joining flexible tubing. One piece of tubing is fitted to each half of the connector and the two halves can then easily be joined or separated.

Size	1	2	
Int. dia. of tubing	7 to 9	10 to 16 mm	
Dozen	27/-	31/-	m
Each	3/8	4/1	


TX-858

TX-860

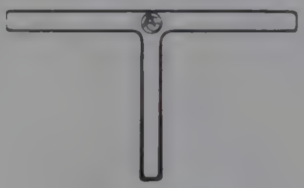
T-TUBES, glass.

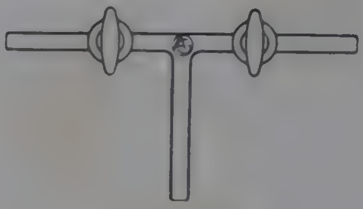
Limb length	40	50	70 mm	
Ext. dia.	5	7	10 mm	
Dozen	11/6	13/-	17/-	a
Each	2/7	2/9	3/-	

TX-865

T-TUBES, polypropylene, corrugated for connecting flexible tubing.

Length	27	36	40 mm	
For tubing bores	5·7	7·5 to 8·3	10–12·5 mm	
Dozen	12/-	13/-	20/-	m
Each	2/8	2/9	3/3	


TX-860


TX-870

TX-870

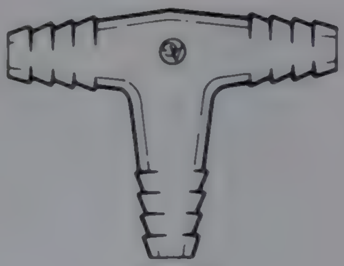
T-TUBES, glass, with two stopcocks.

Limb length	60	70 mm	
Ext. dia.	5	7 mm	
Dozen	220/-	255/-	a
Each	20/-	23/6	

TX-875

T-TUBE ADAPTER, (AG), consisting of glass T-tube with corrugated nipple ends to accept tubing from 5-12 mm bore ... ... Dozen £2.17. 0. Each £0. 6. 0. *a*

TX-865


TX-875

TX-880

Y-TUBES, glass.

Limb length	40	50	70 mm	
Ext. dia.	5	7	10 mm	
Dozen	14/6	16/-	22/-	a
Each	2/10	2/11	3/5	

TUBING EXPANDERS

These useful tools provide a ready means of expanding the ends of rubber or plastics tubing and fitting them on to glass tubing or nipple connectors without any risk of damage to the glassware. The three jaws of the pliers are fitted with bent needles, the ends of which are inserted into the tubing. On squeezing the handles, the three needles move apart concentrically and the tubing is stretched. It can then be placed over the glass connection and the tool withdrawn. Two sizes are available and spare sets of needles can be obtained in the event of breakage or wear.

TX-900

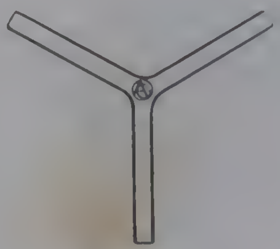
TUBING EXPANDER, small size for tubing of minimum 1·5 mm bore, maximum opening 12 mm.
Each £2.15. 6. *m*

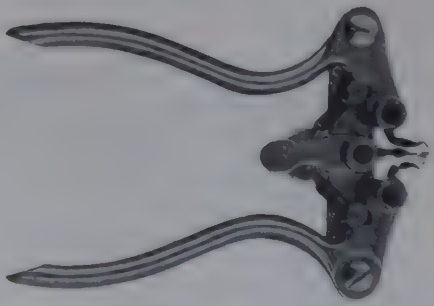
TX-901 **Needles,** set of 3 for replacement. Set £0.16. 0. *m*

TX-910

TUBING EXPANDER, large size for tubing of minimum 4 mm bore, maximum opening 22 mm.
Each £3. 5. 6. *m*

TX-911 **Needles,** set of 3 for replacement. Set £0.16. 0. *m*


TX-880


TX-910

All items on this page normally available from stock.

ULTRASONIC CLEANERS AND EMULSIFIER

Ultrasonic cleaning tanks provide rapid and efficient cleaning of inaccessible surfaces by means of cavitation caused by bombardment with ultrasonically agitated solvent molecules. Articles which can be cleaned include delicate mechanisms which need not be dismantled, electrical components, glass apparatus, hypodermic syringes, dental and medical instruments, etc.

Ultrasonic agitation also increases rate of solution, accelerates some chemical reactions, improves solution degassing and can be used for emulsifying and producing colloidal solutions.

The equipment listed below includes a generator and a stainless steel tank. The generator develops power at frequencies above the audible limit, pulsed at mains frequency; a tuning indicator shows when resonance is attained for maximum power dissipation in the tank. The signal is transmitted via coaxial cable to a barium titanate transducer bonded to the base of the tank.

The solvent may be heated by a small immersion heater e.g. HD-100 to a maximum temperature of 50°C but the efficiency of the transducer falls with increasing temperature.

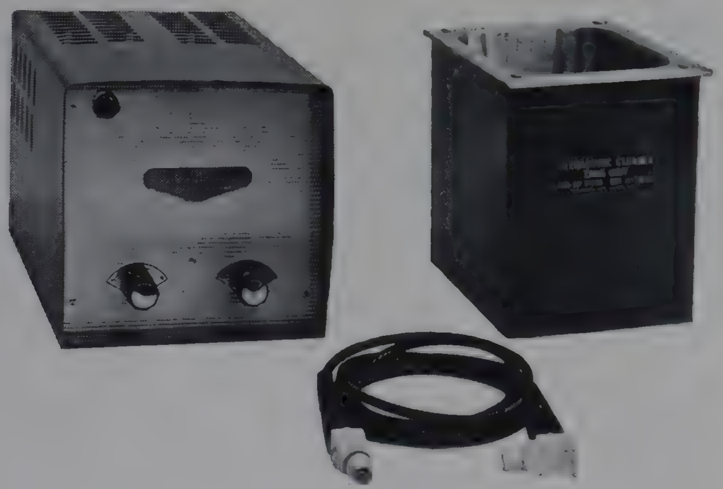
Suitable cleaning solutions for general purposes may be prepared from cleanser CM-740 or for special purposes from cleansing fluid CM-751.

UL-100

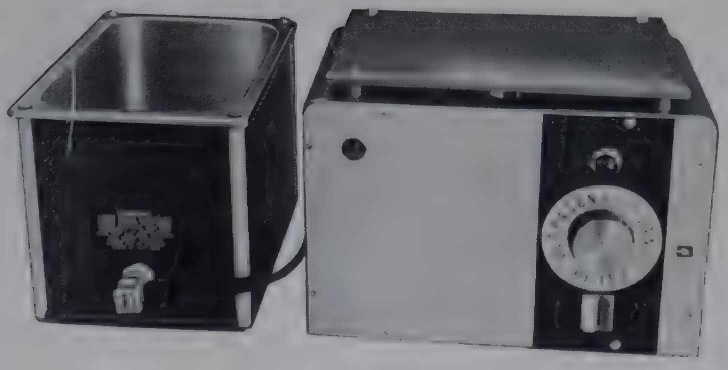
ULTRASONIC CLEANING KIT, comprising a 2 litre capacity cleaning tank, 40W mean output, 80 kHz generator, coaxial connector and instructions manual. For 200/250V 50 Hz single phase supply. Each **£55. 0. 0.** *m*

UL-105

ULTRASONIC CLEANING KIT, comprising a 4 litre capacity cleaning tank, 60W mean output 30 kHz generator, coaxial connector and instructions manual. For 200/250V 50 Hz single phase supply. Each **£85. 0. 0.** *m*



UL-100



UL-105

CLEANING MATERIALS AND WASHING EQUIPMENT

Other items for cleaning and washing are listed elsewhere in this catalogue as below:

Cloths	see **CM-510 to CM-560**
Chamois leather	see **CM-590**
Sponges	see **CM-620**
Tissues	see **CM-650 to CM-662**
Liquid cleansers	see **CM-740 to CM-751**
Polishes	see **CM-760 to CM-775**
Bottle washers	see **WD-020 and WD-050**
Pipette washers	see **WD-110**

Ultrasonic emulsifier see MU-950 in List No. sequence.

All items on this page normally available from stock.

VACUUM APPARATUS

SECTION INDEX

Rotary Pumps

List No.	Model	Page
VB-040	ISP20	785
VB-045	2SC20A	785
VB-105	ES 35	786/787
VB-115	ED 35	786/787
VB-125	ES 75	786/787
VB-135	ED 75	786/787
VB-145	ES 150	786/787
VB-155	ED 150	786/787
VB-260	PSR1	788
VB-265	PD1	788
VB-275	PSR2	788
VB-280	PD2	788
VB-285	PSR4	788

Gallenkamp vacuum trolley 789
Diffusion pumps 790
Vacuum accessories 791
Gauges 791/792
Electronic gauges 793

Other pumps offering vacuum facilities as tabulated below will be found in List No. sequence.

List No.	Ultimate vacuum (torr)	List No.	Ultimate vacuum (torr)
AF-410	300	**AF-458**	40
AF-414	300	**AF-510**	180
AF-430	100	**AF-535**	150
AF-445	100	**FD-250**	150

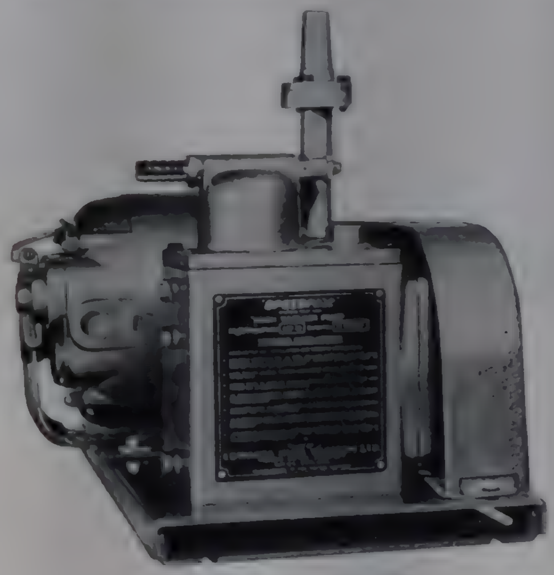
The unit TORR is being used in this catalogue to comply with the recommendation in BS 2951 'Glossary of terms used in high vacuum technology'. Please note that 760 torr = 1 standard atmosphere, therefore for all practical purposes 1 torr = 1 mm Hg. abs.

ROTARY PUMPS

Speedivac Models ISP20 and 2SC20A

The pumps, of the slotted rotor type, are designed for simple, trouble-free operation and are constructed from light alloy die castings. They incorporate oil spray arresters and oil level sight glasses, and are arranged for easy draining. An outfit comprises a pump and motor, with shielded vee-belt, mounted on a rigid baseplate. Each pump is tested before despatch and supplied with an initial oil charge. Outfit VB-045 is provided with the gas ballast facility which enables systems, containing water vapour or other condensable vapours, to be pumped without contaminating the pump oil. This feature prevents the progressive deterioration of the pump performance or the limitation of application to completely clean systems.

The pumps are fitted with a flanged connector suitable for direct connection to 12 mm bore flexible tubing.



VB-040 with VB-070

VB-040

VACUUM PUMP, *Speedivac* **ISP20,** single stage for 0·2 torr, 22 l/min displacement, with $\frac{1}{4}$ hp motor for 220/240V 50 Hz single phase supplies. Each **£43. 0. 0.** *f*

VB-045

VACUUM PUMP, *Speedivac* **2SC20A,** double stage with gas ballast, for 0·001 torr (0·05 torr with ballast), 22 l/min displacement, with $\frac{1}{4}$ hp motor for 220/240V 50 Hz single phase supplies... ... Each **£59. 0. 0.** *f*

REPLACEMENT PARTS

VB-047	**Vee-belt,** for VB-040 or VB-045 ...	Each **£0. 7. 0.**	*m*
LX-140	**Pump oil.** For price see entry in List No. sequence.		

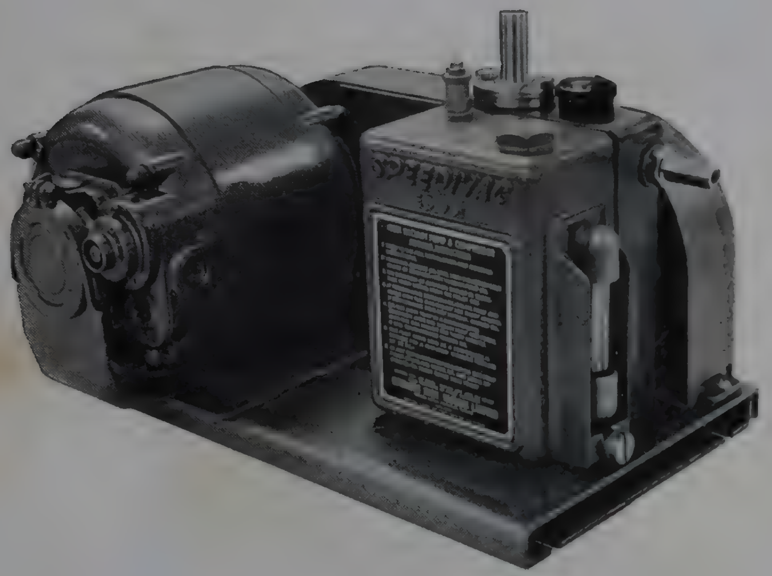
ACCESSORIES

VB-061	**Anti-vibration mountings,** for VB-040 and VB-045.	Set **£3. 0. 0.**	*f*
VB-066	**Non-return valve,** for VB-040 and VB-045.	Each **£5. 3. 6.**	*f*
VB-068	**Moisture trap,** with desiccant tray, for direct mounting on VB-040 and VB-045	Each **£12. 2. 0.**	*f*
VB-070	**Adapter,** metal, with 19/26 cone ...	Each **£1. 5. 0.**	*f*
Q-MF13/2	**Adapter,** with 19/26 socket to fit VB-070 and straight nozzle suitable for 8 mm bore flexible tubing. For price see entry on page 646.		
TX-755	**Tubing,** neoprene, heavy wall.	For details and prices see entries in List No. sequence.	
TX-778	**Tubing,** PVC, reinforced wall.		

All items on this page normally available from stock.

ROTARY PUMPS

Speedivac Models ES and ED



VB-105

A range of pumps, of similar type to those listed on page 785, of the most advanced design and incorporating a number of valuable additional features.

OIL CONTROL VALVE

All pumps are fitted with a patented valve to prevent oil flooding the pipeline system, and making additional non-return valves unnecessary.

VACUUM TIGHT CASING

Effective sealing makes the pump ideal for gas recirculation and recovery work.

INLET FILTER

Inlet filter cleans and silences ballast air under all conditions.

BAFFLE SYSTEM

An effective control prevents oil spray discharge. For complete elimination of oil mist, special accessories are available.

VACUUM CONNECTION

All pumps are fitted with a flange clamping muff coupling enabling metal or glass pipeline connections to be made instantly. The couplings supplied normally have fittings for BS 659 tubing.

Adapters are available for connecting to flexible vacuum tubing or standard conical joint all glass systems.

TWO STAGE PUMPS

An oil recirculation device permits only degassed oil to enter the high vacuum stage, and high vacua can be obtained even on full gas ballast.

PRESSURE DUTY

VB-105 can be used as a compressor, giving up to 1·4 kgf/cm^2. An adjustable pressure relief valve is fitted.

LARGER PUMPS

Other *Speedivac* pumps are available in this range with displacements up to 7900 l/min. Details on application.

PUMP DATA

List No.	Model No.	No. of stages	Ultimate vacuum, torr		Approx. water vapour pumping rate g/hour	Displacement l/min	Oil charge litres	Motor hp	Nominal bore of connector, mm
			Without gas ballast	With gas ballast					
VB-105	ES 35	1	0·01	0·5	40	44	0·45	¼	12
VB-115	ED 35	2	0·0005	0·02	80	44	0·75	¼	12
VB-125	ES 75	1	0·005	0·5	55	82	1·2	¼	25
VB-135	ED 75	2	0·0002	0·005	76	82	2·0	⅓	25
VB-145	ES 150	1	0·005	0·5	180	165	1·8	⅓	25
VB-155	ED 150	2	0·0001	0·001	66	165	1·8	½	25

ROTARY PUMPS

Speedivac Models ES and ED

VB-105

VACUUM PUMP, *Speedivac* **ES 35,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions.
Each **£58.** 0. 0. *f*

VB-115

VACUUM PUMP, *Speedivac* **ED 35,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions.
Each **£84.** 0. 0. *f*

REPLACEMENT PART

VB-116 **Vee-belt,** for VB-105 and VB-115 ... Each **£0.** 5. 6. *f*

ACCESSORIES

VB-118 **Adapter,** flexible metal, to connect 6·5 or 8 mm rubber vacuum tubing to VB-105 or VB-115. Each **£0.** 16. 0. *b*

VB-119 **Cone,** borosilicate glass, 19/26, to connect an all-glass system to VB-105 or VB-115 ... Each **£0.** 11. 6. *a*

VB-121 **Anti-vibration mountings,** for VB-105.
Set **£3.** 0. 0. *f*

VB-122 **Anti-vibration mountings,** for VB-115.
Set **£3.** 0. 0. *f*

VB-068 **Moisture trap,** with desiccant tray. For price see entry in List No. sequence.

VB-123 **Adapter,** connecting VB-105 or VB-115 to trap VB-068.
Each **£2.** 8. 6. *f*

TX-755 **Tubing,** neoprene, heavy wall.
TX-778 **Tubing,** PVC, reinforced wall.
} For details and prices see entries in List No. sequence.

VB-125

VACUUM PUMP, *Speedivac* **ES 75,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions.
Each **£80.** 0. 0. *f*

VB-135

VACUUM PUMP, *Speedivac* **ED 75,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions.
Each **£105.** 0. 0. *f*

VB-145

VACUUM PUMP, *Speedivac* **ES 150,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions.
Each **£106.** 0. 0. *f*

VB-155

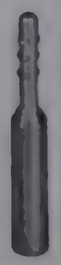
VACUUM PUMP, *Speedivac* **ED 150,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions.
Each **£148.** 10. 0. *fN*

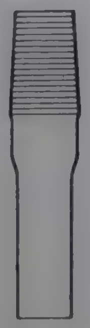
LX-140 **Pump oil,** for all pumps VB-105 to VB-155. For price see entry in List No. sequence.

ACCESSORY

VB-159 **Anti-vibration mountings,** for outfits VB-125 to VB-155 ... ... Set **£3.** 0. 0. *fN*

When ordering please specify for which pump.


VB-118


VB-119

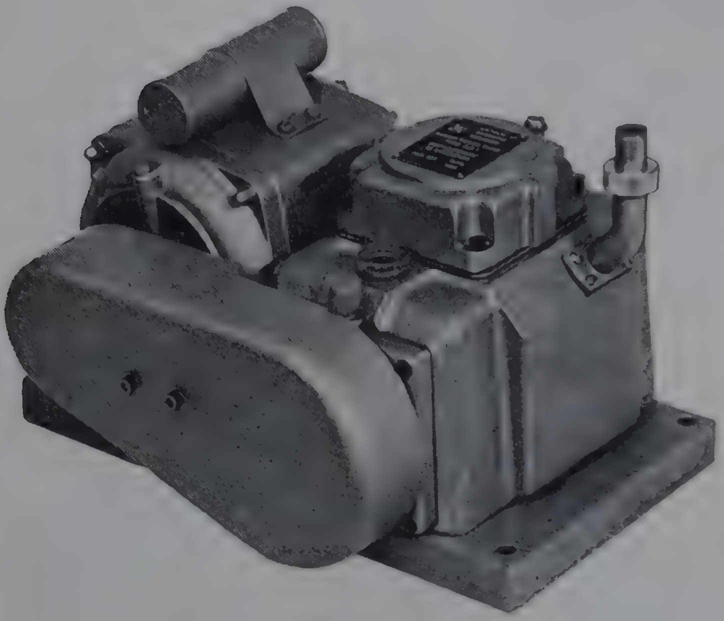
VB-175

VB-175

OIL MIST FILTER, *Speedivac* **OMF200,** for use with vacuum pumps, up to 200 l/min displacement. Reduces the air pollution by separating and trapping oil mist from the discharge of any oil sealed rotary pump, and is particularly valuable where the outlet has to be indoors, such as with trolley mounted pumps.
Each **£14.** 0. 0. *fN*

Items on this page normally available from stock except those coded *N.*

ROTARY PUMPS



VB-260

A range of economically priced vacuum pumps for general laboratory use, yet capable of attaining high vacuum. Of the rotating piston type, they are belt driven, but the careful design and robust construction keep noise and vibration to a minimum. All pumps have adjustable gas ballast facilities which reduce contamination of the oil. The large oil capacity helps to ensure long working life.

Vacuum connections are easily made, by a compression coupling on to 12 mm nominal bore tubing to BS 659, or on to glass tubing of approximately 15 mm outside diameter. Adapters are available for flexible tubing or standard conical joint.

PUMP DATA

List No.	Model No.	No. of stages	Ultimate vacuum, torr		Displacement l/min	Oil charge, litres	Motor hp
			Without gas ballast	With gas ballast			
VB-260	PSR1	1	0·005	1·0	44	2·3	$\frac{1}{8}$
VB-265	PD1	2	0·0002	0·02	44	1·7	$\frac{1}{4}$
VB-275	PSR2	1	0·005	0·5	99	2·3	$\frac{1}{4}$
VB-280	PD2	2	0·0002	0·01	99	1·7	$\frac{1}{3}$
VB-285	PSR4	1	0·005	0·5	161	4·6	$\frac{1}{3}$

VB-260

VACUUM PUMP, *N.G.N.* **Model PSR1,** construction and performance as specified, for 230/250V 50 Hz supplies, complete with one gallon of oil and set of spare gaskets.
Each **£43. 6. 0.** *f*

VB-265

VACUUM PUMP, *N.G.N.* **Model PD1,** construction and performance as specified, for 230/250V 50 Hz supplies, complete with one gallon of oil and set of spare gaskets.
Each **£58. 16. 0.** *f*

VB-275

VACUUM PUMP, *N.G.N.* **Model PSR2,** construction and performance as specified, for 230/250V 50 Hz supplies, complete with one gallon of oil and set of spare gaskets.
Each **£58. 14. 0.** *f*

VB-280

VACUUM PUMP, *N.G.N.* **Model PD2,** construction and performance as specified, for 230/250V 50 Hz supplies, complete with one gallon of oil and set of spare gaskets.
Each **£86. 10. 0.** *f*

VB-285

VACUUM PUMP, *N.G.N.* **Model PSR4,** construction and performance as specified, for 230/250V 50 Hz supplies, complete with one gallon of oil and set of spare gaskets.
Each **£84. 16. 0.** *f*

REPLACEMENT PARTS

LX-140 **Pump oil.** For price see entry in List No. sequence.

ACCESSORIES

VB-290	**Connector,** moulded rubber, for joining 12 mm bore tubing	Each **£0. 6. 8.** *fS*
VB-118	**Adapter,** metal to connect 6·5 or 8 mm bore vacuum tubing	For prices see entries in List No. sequence.
VB-119	**Cone,** glass, 19/26 to connect pumps to all glass system	
TX-775	**Tubing,** neoprene, heavy wall	
TX-778	**Tubing,** PVC, reinforced wall	

N.G.N. **diffusion pumps are also available. Details on application.**

Items on this page coded *S* **normally available from stock.**

Gallenkamp VACUUM TROLLEY

A robust, efficient and convenient mobile vacuum source for chemical and other laboratories where it is necessary for the vacuum pump to be protected against intake of moisture and chemical vapours. The stove enamelled trolley is of strong tubular frame construction on free running castors with a shelf 56 × 43 cm for the pump. Fitted to the trolley are two vapour traps, a Vacustat calibrated to 10^{-2} torr and a manifold with two control valves.

The trolley can be used for vacua down to about 5×10^{-2} torr depending upon the size and type of vacuum pump used.

Each vapour trap is a borosilicate glass Dewar vessel with a drain tube at the bottom connected to a 100 ml receiving flask by a standard 19/26 ground joint. This novel and simple design ensures both adequate thermal insulation of the freezing mixture and a large condensing surface for contaminating vapours. In use, the trap is filled with alcohol or acetone to which a few lumps of solid carbon dioxide are added, and afterwards it is only necessary to detach the receiving flask and empty out the condensate.

An all-metal manifold with heavy wall rubber tubing connections to the vapour traps ensures safe and leak free connections between the components. The two diaphragm valves control the pumping rate, isolate the source where necessary, and control air intake into the system. A glass trap is optionally available for fitting to the vacuum pump inlet. It has a capacity of 1000 ml, and is recommended for use with pumps having no non-return valves in order to prevent accidental transfer of oil from the pump to the system should the pump be switched off without first breaking the vacuum.

VB-480 with VB-105

VB-480

VACUUM TROLLEY, *Gallenkamp*, as specification, supplied with *Vacustat*, vapour traps and diaphragm valves.
Without vacuum pump ... ... Each **£58. 10. 0.** *b*

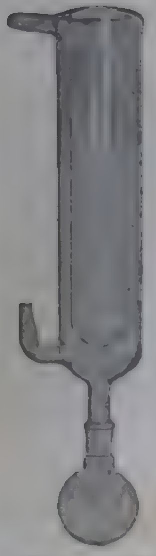
This trolley is suitable for use with VACUUM PUMPS such as VB-040, 045, 105, 115, 260 and 265.

ACCESSORIES

VB-484	**Trap,** borosilicate glass, with 16 mm plain tubing connector for pump inlet	Each **£2. 3. 0.** *a*
Q-MF13/2 **VB-070**	**Adapter set,** to connect pumps VB-040 and VB-045 to trolley manifold	For details and prices see entries in List No. sequence.
VB-118	**Adapter,** to connect pumps VB-105, VB-115, VB-260 and VB-265 to trolley manifold	
VB-290	**Connector,** for connecting pump to oil trap VB-484	

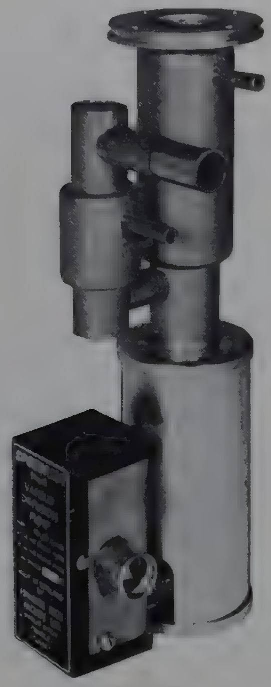
REPLACEMENT PARTS

VB-486	**Vapour trap,** borosilicate glass, Dewar type with standard 19/26 ground cone, without flask VB-488.	Each **£5. 6. 0.** *a*
VB-488	**Flask,** spherical with standard 19/26 ground socket, for use with VB-486	Each **£0. 17. 0.** *a*


VB-486 and VB-488

All items on this page normally available from stock.

VAPOUR DIFFUSION PUMP



VB-500

To attain pressures lower than those given by the two-stage mechanical pump, a vapour pump is essential. In addition, the vapour pump gives high pumping rates and flow rates, at pressures near the ultimate of the mechanical pump. Where time is an important factor, it may be profitable to use a vapour pump to speed operations although the ultimate pressure required is within the capacity of a mechanical pump.

TECHNICAL DATA

Ultimate vacuum	10^{-7} torr
Speed, unbaffled	10 litres/sec
baffled	5–6 litres/sec
Backing pressure	1 torr
Heater loading	175W
Cooling water flow	0·25 litres/min minimum at 15°C

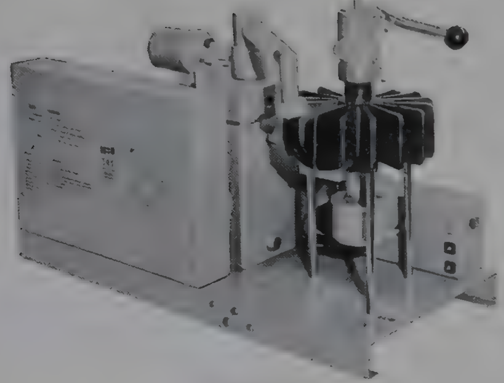
VB-500
VAPOUR DIFFUSION PUMP, mercury, *Speedivac* **EMI,** as specification. For 100/130 or 200/250V supplies. Requires but does not include 30 ml (410 g) of mercury.
Each **£40. 0. 0.** *f*

When ordering please state voltage to the nearest 10V.

ACCESSORIES

VB-583	**Baffle and isolation valve,** water cooled, for fitting directly to VB-500	Each **£16. 0. 0.** *f*
MF-932	**Mercury, triple distilled**	For full details and prices see entries in List No. sequence
VB-105	**Backing pump** ...	

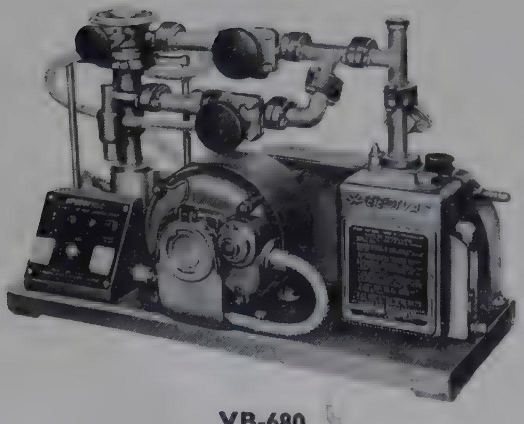
COMBINATION VAPOUR DIFFUSION AND ROTARY PUMPS



VB-660

COMBINATION ROTARY AND DIFFUSION PUMP recommended for schools and teaching establishments. **Approved by the Nuffield Science Teaching Project for Physics.** A gas ballasted rotary pump, having a free air displacement of 44 litres/min and capable of attaining a vacuum of 5×10^{-3} torr, is fitted with an electromagnetic air admittance valve and a riffled outlet nozzle for 12·5 mm bore flexible vacuum tubing. It connects with a convection cooled oil diffusion pump, having a pumping speed of 10 litres/sec and capable of attaining a vacuum of 5×10^{-5} torr when used with the rotary pump, fitted with an outlet nozzle for 12·5 mm bore flexible vacuum tubing. A butterfly valve is supplied for mounting directly on either the rotary or diffusion pump. The rotary pump may be used independently if required.

VB-660
COMBINATION PUMP, *NGN,* **5×10^{-5} torr,** as specification, comprising rotary and diffusion pumps on baseplate, butterfly valve and an initial supply of oil for both pumps. For 220/240V 50 Hz single phase supplies.
Each **£114. 10. 0.** *f*



VB-680

GENERAL PURPOSE COMBINATION PUMP. A gas ballasted rotary pump is connected to a stainless steel water cooled oil diffusion pump giving a combined pumping speed of 6 litres/sec and an ultimate vacuum of 10^{-5} torr. A minimum cooling water flow of 300 ml/min at 15°C is necessary. Manually operated backing, roughing and air admittance valves, a thermal overload switch and on/off switches for the pumps are provided. A baffle valve, which enables the operator to isolate the pump and admit air to the system without switching off the pumps, is mounted on the diffusion pump and terminates in a 29/32 cone for connection to the apparatus to be evacuated. Provision is made for fitting a Pirani gauge head VC-104.

VB-680
COMBINATION PUMP, *Speedivac,* **10^{-5} torr,** as specification, comprising rotary and diffusion pumps and baffle valve mounted on a baseplate, and an initial supply of oil for both pumps. For 220/240V 50 Hz single phase supplies ... ... Each **£168. 18. 6.** *f*

FLEXIBLE TUBING suitable for vacuum applications see TX-755 and TX-778 in List No. sequence.

VACUUM VALVES AND CONTROLS

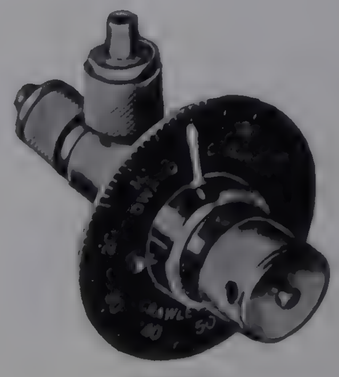
For low vacuum work, glass stopcocks and metal taps are available listed under STOPCOCKS and FURNITURE respectively.

VACUUM NEEDLE VALVES

Needle valves provide fine control of, for example, a gas bleed into a vacuum chamber or a regulated leak to control system pressure.

VB-770

NEEDLE VALVE, vacuum sealed, *Speedivac* **OSID,** with adjustable dial pointer and 0–100 scale. Chromium plated brass construction, with two $\frac{1}{16}$ in unions at right angles ... ... Each **£6. 15. 0.** *f*



VB-770

APIEZON VACUUM GREASES AND WAXES

Organic materials, highly refined for the most exacting vacuum requirements.

VB-880

APIEZON GREASE L, for sealing ground glass vacuum joints and for similar applications. The vapour pressure does not exceed 10^{-3} torr at 300°C. In 2 oz tube. Each **£2. 13. 0.** *f*

VB-882

APIEZON GREASE M, for similar applications to VB-880 but with a vapour pressure not exceeding 10^{-3} torr at 200°C. In 4 oz tube ... Each **£1. 12. 6.** *f*

VB-884

APIEZON GREASE N, a rubber grease for lubricating and sealing conical glass taps in vacuum apparatus. Unsuitable for use above 35°C; vapour pressure 10^{-3} torr. In 1 oz tube ... ... Each **£2. 5. 0.** *f*

VB-886

APIEZON GREASE W, for sealing joints in vacuum systems, with a softening point of 60°C and a vapour pressure of 10^{-6} torr at room temperature. Stick form in 1 lb packet... ... ... Each **£1. 10. 0.** *f*

Silicone grease see LX-235 in List No. sequence.

GJ-330

VACUUM GAUGE, Bourdon tube. For details see entry in List No. sequence.

10
15
5
SPEEDIVAC
20
0
torr

VB-942

Speedivac DIAL GAUGES

These gauges employ an evacuated metal capsule as the pressure sensitive element which is unaffected by barometric changes. Accuracy is 2½% of full scale deflection.

The 4 in diameter dial is housed in a metal case.

List No.	Range, torr	Each	
VB-942	0—20	**£17. 15. 0.**	*fN*
VB-950	0—100	**£17. 15. 0.**	*fN*
VB-955	0—760	**£17. 15. 0.**	*fN*

Items on this page normally available from stock except those coded *N.*

VB-960, VB-962

Vacustat VACUUM GAUGES

These readily portable bench gauges are similar in principle to the McLeod gauge. The gauge is simple to use; the backing plate with attached head scale and reservoir being rotated through 90° to take a reading.

VB-960

VACUUM GAUGE, *Vacustat,* **Model 1B2,** range 10 to 10^{-2} torr. With tripod stand, ⅛ in Speedivac union for connection to the vacuum system and a protective perspex cover. Height 230 mm ... Each **£12. 8. 0.** fS

VB-962

VACUUM GAUGE, *Vacustat,* **Model 2B2,** as VB-960, but range 1 to 10^{-3} torr ... ... Each **£12. 15. 0.** fS

VB-972

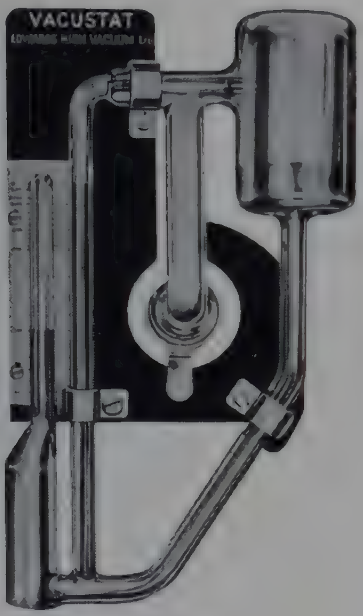
VACUUM GAUGE, *Vacustat,* **Model 2G,** range 1 to 10^{-3} torr, similar to VB-960 but of all glass construction and without a stand. The gauge is connected to the vacuum system by a 14/23 cone about which it is turned to take a reading ... ... Each **£11. 0. 0.** f

MERCURY CHARGES

All *Vacustat* Vacuum gauges require approximately 17 ml (250 g) of triple distilled mercury; the exact amount necessary is etched on the individual gauge heads.

Triple distilled mercury, see MF-932 in List No. sequence.

VACUUM MANOMETERS, Anschutz see MB-050 and MB-060 in List No. sequence.



VB-972

McLEOD GAUGE

This gauge incorporates a method of operation which eliminates the need for a secondary vacuum pump and results in a gauge which is compact (38 cm high without legs) and suitable for either bench mounting or for building into equipment. The glass gauge head is completely enclosed in a metal shield with Perspex front. Connection to the vacuum system is made via a 14/23 male cone joint.

Operation is by a handwheel which is turned through approximately 90° to raise the mercury to the level necessary for measurement. On release the mercury automatically returns to the lower position ready for the next measurement.

VB-995

McLEOD GAUGE, *N.G.N.*, range 1 to 10^{-4} torr, for bench mounting. **Without mercury.** Each **£30. 12. 0.** f

ACCESSORY

MF-932 Mercury, triple distilled (1 kg required). For price see entry in List No. sequence.

REPLACEMENT PART

VB-997 Glass gauge head ... ... Each **£6. 10. 0.** f

Other *N.G.N.* vacuum gauges and instruments are available. Details on application.

VB-995

Items on this page coded S normally available from stock.

THERMAL (PIRANI) VACUUM GAUGES

These gauges operate by the change in temperature and hence in resistance of an electrically heated filament as the thermal conductivity of the surrounding gas changes with pressure. The resistance change is measured by a Wheatstone bridge circuit. Thus, a gauge can give a direct and continuous reading of the total gas and vapour pressure in a vacuum system.

GAUGE HEADS

Two heads may be connected to one gauge; the current flowing continuously through the filaments of both and a selector switch being used to take readings from either.

PRESSURE RANGES

List No.	Model No.	Pressure range torr	Glass gauge head	Metal gauge head
VC-100	B5	5×10^{-1} to 1×10^{-3}	VC-102	VC-104
VC-120	8-2	1 to 5×10^{-3} 5×10^{-3} to 1×10^{-4}	VC-124	

VC-100

VACUUM GAUGE, Pirani, *Speedivac* **B5,** as specification, for bench or panel mounting. Dimensions 14×13×10 cm. With built-in transformer and voltage stabiliser for 200/250V 50/60 Hz supplies. **Without gauge head** ... ... Each **£30. 0. 0.** *f*

ACCESSORIES

VC-102 **Gauge head,** glass, *Speedivac* G6A, for VC-100, with 14/23 cone connector and 14/23 borosilicate glass socket for connection to glass vacuum system. With 180 cm lead ... ... Each **£8. 5. 0.** *f*

VC-104 **Gauge head,** metal enclosed, *Speedivac* M6A, for VC-100, with connection to suit ½ in bore, 0·596 in (15 mm) outside diameter metal piping. With 180 cm lead. Each **£8. 5. 0.** *f*

VC-105 **Adapter,** for fitting gauge to freeze drying unit FM-350. Each **£1. 15. 0.** *f*

VC-120

VACUUM GAUGE, Pirani, *Speedivac* **8-2,** dual scale, as specification. With transistor stabilised voltage supply for bench or panel mounting. Dimensions 22×17×19 cm. For 200/250V 50 Hz supplies. **Without gauge head** ... ... Each **£58. 0. 0.** *f*

ACCESSORY

VC-124 **Gauge head,** glass, *Speedivac* G5-B2 with 14/23 cone connector and 14/23 borosilicate glass socket for connection to glass vacuum system. With 180 cm lead. Each **£22. 0. 0.** *f*

torr
MODEL B5

VC-100

VC-120 with glass gauge head

VC-220

HIGH FREQUENCY TESTERS

When the probe of a high frequency tester is placed close to the wall of a glass vacuum system, a discharge is produced. With a knowledge of the gas in the system and from the appearance of the discharge, the pressure in the system can be deduced.

For leak detection, the probe is passed over the external surfaces of the system and any pinhole or crack will be located instantly by a thread like discharge running through it.

The probe unit is 25 cm long × 56 mm diameter and is contained in a moulded plastics case. The probe of VC-240 is connected to a transformer unit which is fitted with a mains switch.

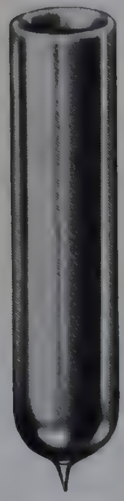
VC-220

HIGH FREQUENCY TESTER, *Speedivac* **Model T1,** as specification, output 300 kHz. For 200/250V 50/60 Hz supplies. With 180 cm lead ... Each **£15. 0. 0.** *f*

VC-240

HIGH FREQUENCY TESTER, *Speedivac* **Model T2,** as specification, output 4-5 MHz. For 200/250V 50/60 Hz supplies. With 180 cm lead ... Each **£27. 0. 0.** *f*

When ordering please state voltage and nature of supply.



VC-505

VC-521

VC-525

VC-530

VC-550

VACUUM VESSELS

NOTE: Listed capacities and dimensions are approximate.

***VC-505**

VACUUM VESSELS, Dewar, cylindrical, silvered glass.

Capacity	370	825	1260 ml	
Int. dia.	50	75	75 mm	
Int. depth	200	200	300 mm	
Each	**33/–**	**52/–**	**54/–**	m

VC-521

VACUUM FLASKS, *Thermos*, cylindrical, silvered glass, in plastics container, with improved screw stopper and moulded cup.

Capacity	450	750 ml	
Neck dia.	28	28 mm	
Int. depth	170	220 mm	
Each	**8/9**	**15/11**	m

REPLACEMENT PARTS

VC-523	**Glass vessels.**			
	Capacity	450	750 ml	
	Each	5/6	8/6	m

VC-525

VACUUM FLASKS, *Thermos*, **wide mouth,** silvered toughened borosilicate glass inner vessel in polypropylene outer container with handle. Positive seal by screw-in stopper.

Capacity	225	425	850 ml	
Neck dia.	51	51	51 mm	
Int. depth	80	110	215 mm	
Each	**15/–**	**16/6**	**19/11**	m

REPLACEMENT PARTS

VC-526	**Inner glass vessels.**				
	Capacity	225	425	850 ml	
	Each	8/6	9/6	11/3	m

VC-530

VACUUM FLASKS, *Thermos*, with silvered borosilicate glass inner vessel. The wide mouth is closed by a stopper and covered by a moulded cap. For use with solids or liquids. With handle.

Capacity	1130	1700	4500 ml	
Neck dia.	86	109	86 mm	
Int. depth	170	185	260 mm	
Each	**47/6**	**72/6**	**148/5**	m

REPLACEMENT PARTS

VC-532	**Glass vessels.**				
	Capacity	1130	1700	4500 ml	
	Each	26/6	43/–	74/6	m

VC-550

VACUUM FLASK, *Thermos*, 4·5 litre, with silvered borosilicate glass inner vessel, neck diameter 140 mm, internal depth 280 mm, in a heavy gauge metal canister. With an insulated lid fastened by clamps and incorporating an air vent to facilitate removal. For use with solids or liquids. With handle ... ... Each **£10. 9. 11.** m

REPLACEMENT PART

VC-552 **Glass vessels** ... ... Each **£3. 4. 6.** m

OTHER VACUUM APPARATUS

Vacuum desiccators	see	DESICCATORS
Vacuum ovens	see	MV-600 and OV-930
Vacuum taps	see	FW-096 et seq.
Vacuum stopcocks	see	ST-780 et seq.
Vacuum tubing	see	TX-755 and TX-778

All items on this page normally available from stock.

VAPOUR DENSITY APPARATUS

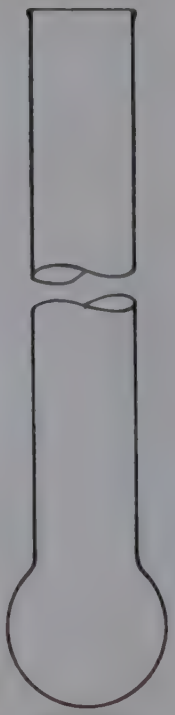
VM-015

VAPOUR DENSITY APPARATUS, Victor Meyer, comprising *Pyrex brand* glass jacket enclosing a borosilicate glass inner tube, overall length 81 cm, with a glass release rod fitted in the side tube. Supplied with one dozen 20 mm glass phials with ground-in stoppers.

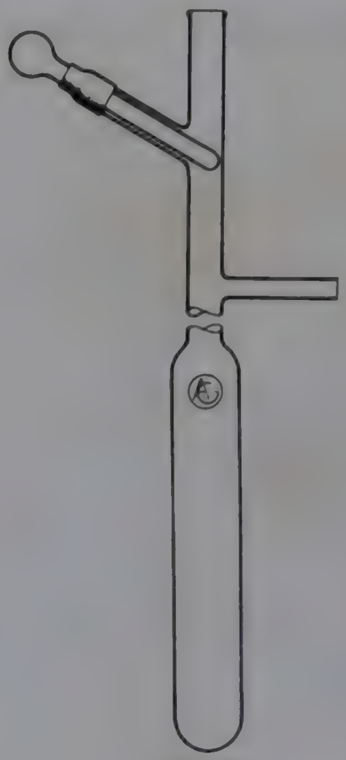
Each **£2. 18. 0.** *a*

REPLACEMENT PARTS

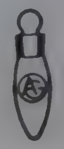
VM-020	**Jacket tube**	Std. pk. of 4 £1. 17. 0.	Each	£0. 10. 5.	*d*
VM-025	**Inner tube**		Each	£0. 17. 0.	*a*
VM-030	**Phial**		Dozen	£1. 11. 0.	*a*



VM-020



VM-025



VM-030

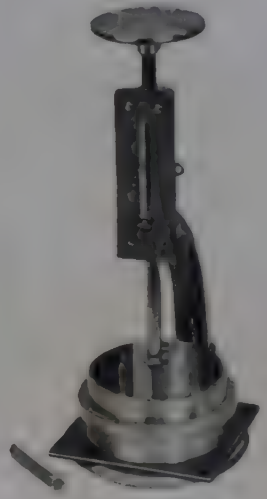
VICAT APPARATUS

VP-100

VICAT APPARATUS, for determination of consistency and initial and final setting times of cement. Weight of plunger together with consistency plunger or initial or final set needles adjusted to 300 g. Supplied with consistency plunger, initial and final set needles, mould and plate ... ... Each **£14. 15. 0.** c

REPLACEMENT PARTS

VP-104	**Consistency plunger,** brass ...	Each	£0. 16. 0.	c
VP-106	**Initial set needle,** hardened steel	Each	£0. 12. 6.	c
VP-108	**Final set needle,** hardened steel...	Each	£0. 16. 0.	c
VP-110	**Split mould and baseplate,** brass and mild steel respectively	Each	£3. 12. 0.	c



VP-100

VISCOMETRY

SECTION INDEX

GLASS VISCOMETERS page

Cannon-Fenske 801
Falling sphere 798
Master 801
Reverse flow U-tube 799
Standard U-tube 799
Suspended level 800
Ubbelohde 800

FLOW CUPS

British Standard 797
Ford 797
Zahn 798

ROTATIONAL VISCOMETERS page

Universal torsion 796
Portable, Ferranti 797

VISCOMETER BATHS

Maximum temperature 120°C 802
Maximum temperature 250°C 804

MISCELLANEOUS VISCOMETERS IN OTHER SECTIONS

Engler 612
EVT 611
I.C.I. Rotothinner 572
Redwood 613
Standard tar 612

All items on this page normally available from stock.

Gallenkamp UNIVERSAL TORSION VISCOMETER

FOR USE WITH LIQUIDS WITH NEWTONIAN OR ANOMALOUS VISCOSITY.

VISCOSITY RANGE 0·25 TO 10^3 POISES

AND TO 10^6 POISES WITH ACCESSORIES

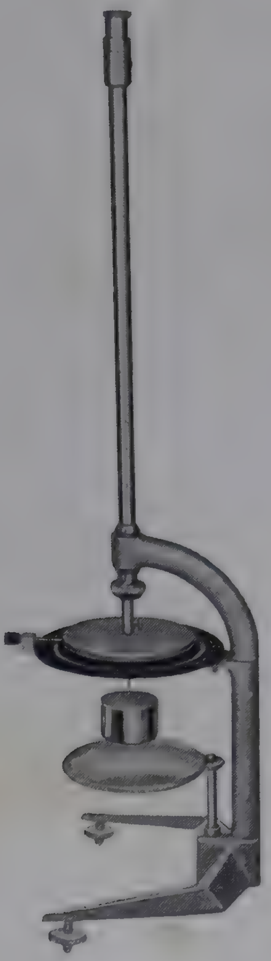
FEATURES

- **Accurate results obtainable by unskilled operator**
- **Rapid determinations**
- **No thermostatically controlled bath required**
- **Results unaffected by suspended solids**
- **Wide range covered with different sizes of cylinders and wires**

APPLICATIONS

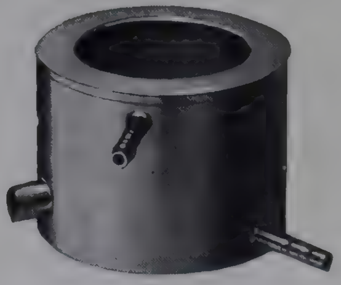
- **Dairy products testing**
- **Oil testing**
- **Paint testing**
- **Rubber latex testing**

For many other materials including glues, gums, inks, chocolate, raw sugar, cosmetics and ceramic slips



VS-010

VS-034



VS-035

VS-036

DESCRIPTION

Essentially, the instrument comprises a metal cylinder suspended in the sample by a torsion wire. One end of the wire is attached to an adjustable head at the top of the instrument. At the lower end of the wire there is a flywheel disk with a pointer fixed on the edge, reading on a 360° circular scale. The zero point on the scale is fitted with a stop and a release pin which engages the flywheel pointer. The cylinder is supported from the lower side of the flywheel. A sample support table which swings to one side and has two fixed vertical positions is provided. The apparatus is mounted on levelling feet.

OPERATION

The viscosity of the sample is determined by the damping effect on the cylinder. The torsion cylinder is immersed about 1 cm below the surface of the sample which is contained in a cup or beaker. The flywheel disk is rotated through 360° and held by the release pin. When this pin is removed the flywheel and cylinder rotate back through the complete turn plus a part of an additional revolution. The amount of rotation beyond the zero point is noted on the scale and is a measure of the viscosity.

THIXOTROPY

If materials with thixotropic or other anomalous properties are to be tested the modified instrument VS-020 is recommended. This has an extra graduated scale at the top of the torsion wire so that torsion can be applied to the wire without disturbing the sample.

Each instrument is supplied with full working instructions for use both as a viscometer and as a thixotrometer. The instructions also contain a copy of the approximate calibration curves for the wire and cylinder combinations supplied with VS-010 and VS-020.

NOTE: Calibration curves are available for wires gauges 30 and 36 only.

VS-010

VISCOMETER, UNIVERSAL TORSION, *Gallenkamp*, as specification, with two interchangeable wires 30 and 36 SWG, and three cylinders $\frac{1}{4}$, $\frac{11}{16}$ and $1\frac{5}{8}$ in diameter ... ... Each **£24. 0. 0.** *b*

VS-020

VISCOMETER, UNIVERSAL TORSION, *Gallenkamp*, as VS-010 but modified for use as a thixotrometer as well as a viscometer ... Each **£26. 0. 0.** *b*

ACCESSORIES AND REPLACEMENTS

VS-030 **Cylinders, torsion.**

Diameter	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{11}{16}$	$1\frac{1}{8}$	$1\frac{5}{8}$ in	
Dozen	130/–	140/–	170/–	180/–	240/–	*b*
Each	11/9	12/9	15/6	16/6	22/–	

VS-032 **Wires, torsion.**

Gauge	24	26	28	30	32	34	36 SWG

All, Dozen **£7. 10. 0.** Each **£0. 13. 6.** *b*

VS-034 **Cup,** for containing liquid sample, comprising plated metal cup with thermometer tubulure mounted on a flat disk which fits in the centring guides of the sample table. Internal diameter 67 mm, internal depth 60 mm. Each **£2. 3. 0.** *b*

VS-035 **Cup,** as VS-034, but water jacketed permitting temperature control by water circulation. Each **£5. 10. 0.** *b*

VS-036 **Stirrer,** to fit cups VS-034 or VS-035. Each **£1. 12. 0.** *b*

EVT Viscometer	see	PH-620
ICI Rotothinner	see	PB-255

in List No. sequence.

All items on this page normally available from stock.

ROTATING CYLINDER VISCOMETER

When immersed in the sample, an outer cylinder driven by a synchronous motor rotates the liquid and causes a viscous drag on a spring loaded coaxial inner cylinder. The resulting angular deflection of the latter, shown as a pointer reading, is proportional to the viscosity. As the measurement of angular deflection is displayed continuously, the way in which viscosity varies with time (and temperature) at fixed ratio of shear can be studied.

For direct determination of the flow properties of true or thixotropic liquids in the laboratory within the range 0 to 200,000 poises at temperatures up to 30°C.

VS-105

TECHNICAL DATA

Model	VL	VM	VH
Viscosity range, poise	0·33 to 6·2	2·7 to 121·8	2970 to 196,840
No. of ranges	15	9	9
Speed range, rev/min	297·3 to 99·5	159·1 to 15	11·54 to 1·0
Gear box speeds	5	3	3
Shear rate range, s^{-1}	950 to 68	258 to 8·8	9·1 to 0·31
Torque spring, g.cm	40	60	200

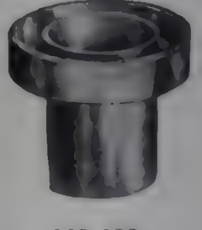
VS-105
VISCOMETER, ROTATING CYLINDER, *Ferranti*, as specification, with three inner and one outer stainless steel cylinders. Complete with leather case. For 200/250V 50 Hz supplies. **Please specify Model VL, VM or VH required** ... ... Each **£197.17. 0.** *fN*

When ordering please state voltage and nature of supply.

Gallenkamp FLOW CUPS

Type No.	Orifice dimensions mm		Approximate viscosity range *, stokes
	Diameter	Length	
B 2	2·38	4·62	0·1 to 1
B 4	3·97	5·26	0·8 to 7
B 6	7·12	6·60	6·0 to 30
FORD No. 4	3·97	—	1 to 10

* These figures are quoted for guidance only. Non-Newtonian behaviour and anomalous flow can cause an apparent variation from these ranges and BS 1733 advises against conversion of flowtimes to viscosities.


VS-132
to
VS-140

VS-145

VS-132
FLOW CUP, *Gallenkamp*, **BS 1733 type B2,** orifice dimensions as above tabulation. In nickel plated brass with integral skirt to protect the orifice. Each **£4.10. 0.** *b*

VS-134
FLOW CUP, *Gallenkamp*, as VS-132 but **BS 1733 type B4** ... ... Each **£4.10. 0.** *b*

VS-136
FLOW CUP, *Gallenkamp*, as VS-132 but **BS 1733 type B6** ... ... Each **£4.10. 0.** *b*

VS-140
FLOW CUP, *Gallenkamp*, **FORD No. 4,** adjusted to give a flow time of 50 seconds with an oil having a viscosity of 1·63 stokes. In nickel plated brass with integral skirt to protect the orifice. ... ... Each **£4.18. 0.** *b*

ACCESSORY
VS-145 Stand for VS-132 to VS-140 with enamelled base, levelling feet and chromium plated rod with adjustable support bracket ... ... Each £2. 8. 0. *b*

Redwood Viscometers—see PH-710 et seq. in List No. sequence.

Items on this page normally available from stock except those coded *N*.

FLOW CUPS

VS-160 with TJ-970

VS-160

VISCOMETERS, ZAHN FLOW CUP, stainless steel, for the rapid, approximate measurement of the viscosities of clear and opaque fluids. The 44 ml capacity cup has a precision reamed orifice at the bottom and is suspended from a looped wire handle 30 cm in length. The viscometer is used by dipping the cup into the fluid to be tested, withdrawing it and timing the duration of the outflow. A bracket is mounted on the handle for fitting a bimetallic dial thermometer for simultaneous temperature measurement.

Size No.	1	2	3	
Viscosity range	20–85	30–170	170–550	cP
Orifice diameter	0·078	0·108	0·148	in

Each £5. 0. 0. *m*

Size No.	4	5	
Viscosity range	200–900	250–1200	cP
Orifice diameter	0·168	0·208	in

Each £5. 0. 0. *m*

When ordering please state size required.

ACCESSORY

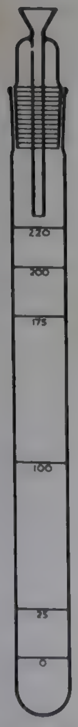
TJ-970 **Dial thermometers,** bimetallic with stainless steel case and stem 200 mm long.

Scale span	—10 to 110	0 to 220	0 to 400	°C
Subdivision	1	2	5	°C

For prices see entry in List No. sequence.

Technico FALLING SPHERE VISCOMETERS

REGD. TRADE MARK



VS-202

VS-202

VISCOMETERS, FALLING SPHERE, *Technico,* to BS 188, borosilicate glass, comprising a fall tube, graduated at six points, fitted with a 24/29 socket and a stopper with a ball release tube with a 24/29 cone. **Without balls.**

Int. dia. of fall tube	25	40 mm	
Each	£1. 14. 0.	£1. 17. 0.	*a*

REPLACEMENT PARTS AND ACCESSORIES

VS-205 **Fall tubes,** with 24/29 socket, without steel balls or stopper.

Int. dia.	25	40 mm	
Each	21/6	25/6	*a*

VS-206 **Steel balls,** density 7·785 g/cm³. Viscosity ranges quoted in thousands cS.

Diameter	1/16	3/32	1/8	5/32 in	
Viscosity range					
from	1·1	2·5	4·5	7·0	
to	37·4	84·0	150·0	234·0	
Pack of 100	6/–	3/–	3/–	3/–	c

The 1/16 in and 3/32 in balls are suitable for both tubes, and the 1/8 in and 5/32 in balls for the 40 mm tube only.

VS-207 **Stopper,** with 24/29 cone and ball release tube.
Each £0. 11. 3. *a*

All items on this page normally available from stock.

Technico STANDARD U-TUBE VISCOMETERS

REGD. TRADE MARK

VS-220

VISCOMETERS, STANDARD U-TUBE, *Technico*, type BS/IP, to ASTM D445–IP 71 and ASTM D2515, and type BS/U to BS 188.

Viscometer size	O	A	B	C	D	
Nominal constant	0·001	0·003	0·01	0·03	0·1	cS/s
Viscosity range, approx.	0·3–3	1·5–10	4–10	7·5–35	20–120	cS

All, Dozen **£23. 0. 0.** Each **£2. 2. 0.** *a*

Viscometer size	E	F	G	H	
Nominal constant	0·3	1·0	3·0	10	cS/s
Viscosity range, approx.	60–500	200–1,000	600–4,000	2,000–15,000	cS

All, Dozen **£23. 0. 0.** Each **£2. 2. 0.** *a*

VS-225

VISCOMETERS, STANDARD U-TUBE, *Technico*, as VS-220 but with **works certificate** ... ... Each **£5. 14. 0.** *a*

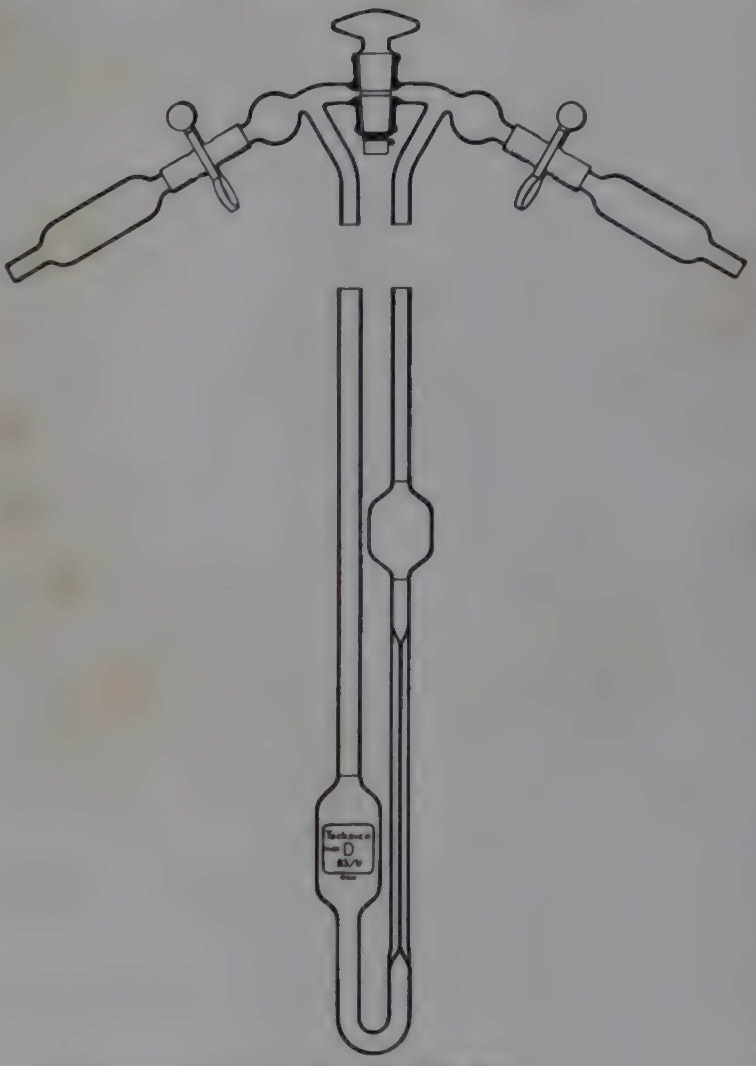
VS-227

VISCOMETERS, STANDARD U-TUBE, *Technico*, as VS-220 but with **NPL certificate** ... ... Each **£12. 12. 0.** *a*

When ordering VS-225 and VS-227 please state viscometer size required.

ACCESSORY

VS-228 Sealing device, for viscometers VS-220 to VS-227 comprising stopcock branch tube and two desiccant bulbs. Set £1. 13. 0. *a*



VS-220 with VS-228

Technico REVERSE FLOW U-TUBE VISCOMETERS

REGD. TRADE MARK

VS-250

VISCOMETERS, REVERSE FLOW U-TUBE, *Technico*, reverse flow type BS/IP U-tube to ASTM D445–IP 71 and ASTM D2515, and type BS/IP/RF to BS 188.

Viscometer size	1	2	3	4	5	6	
Nominal constant	0·003	0·01	0·03	0·1	0·3	1	cS/s
For min. viscosity	1·2	2	6	20	60	200	cS

All, Dozen **£27. 0. 0.** Each **£2. 9. 0.** *a*

Viscometer size	7	8	9	10	11	
Nominal constant	3	10	30	100	300	cS/s
For min. viscosity	600	2,000	6,000	20,000	60,000	cS

All, Dozen **£27. 0. 0.** Each **£2. 9. 0.** *a*

VS-255

VISCOMETERS, REVERSE FLOW U-TUBE, *Technico*, as VS-250 but with **works certificate** ... ... Each **£7. 10. 0.** *a*

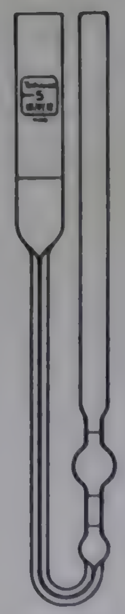
VS-257

VISCOMETERS, REVERSE FLOW U-TUBE, *Technico*, as VS-250 but with **NPL certificate** ... ... Each **£27. 15. 0.** *a*

When ordering VS-255 and VS-257 please state viscometer size required.

ACCESSORY

VS-258 Pipette, for adjusting filling level in viscometers VS-250 to VS-257. Each £0. 10. 6. *a*



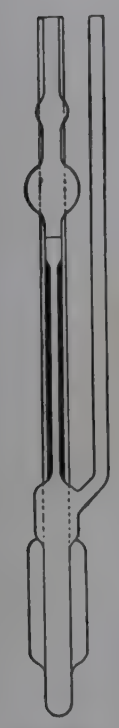
VS-250

All items on this page normally available from stock.

Technico SUSPENDED LEVEL VISCOMETERS

REGD. TRADE MARK

Type BS/IP/SL



VS-280

VS-280

VISCOMETERS, SUSPENDED LEVEL, *Technico*, suspended level type BS/IP/SL, to ASTM D445–IP 71, ASTM D2515 and BS 188.

Viscometer size	1	1A	2	2A	3	
Nominal constant	0·01	0·03	0·1	0·3	1	cS/s
For min. viscosity	3·5	6	20	60	200	cS

All, Dozen £24. 10. 0. Each £2. 5. 0. *a*

Viscometer size	3A	4	4A	5	
Nominal constant	3	10	30	100	cS/s
For min. viscosity	600	2000	6000	20000	cS

All, Dozen £24. 10. 0. Each £2. 5. 0. *a*

VS-285

VISCOMETERS, SUSPENDED LEVEL, *Technico*, as VS-280 but with **works certificate** ... ... Each £5. 17. 0. *a*

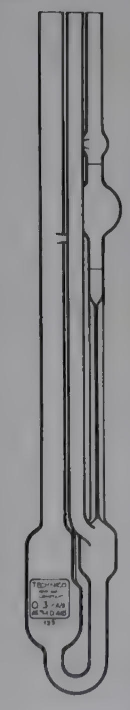
VS-287

VISCOMETERS, SUSPENDED LEVEL, *Technico*, as VS-280 but with **NPL certificate** ... ... Each £12. 14. 6. *a*

When ordering VS-285 and VS-287 please state viscometer size required.

Technico UBBELOHDE SUSPENDED LEVEL VISCOMETERS TO ASTM D445-IP71

REGD. TRADE MARK



VS-290

VS-290

VISCOMETERS, SUSPENDED LEVEL, *Technico*, Ubbelohde suspended level to ASTM D445–IP 71 and ASTM 2515.

Viscometer size	1	1C	1B	2	2C	
Nominal constant	0·01	0·03	0·05	0·1	0·3	cS/s
Viscosity range, approx.	2–10	6–30	10–50	20–100	60–300	cS

All, Dozen £26. 10. 0. Each £2. 8. 0. *a*

Size No.	2B	3	3C	3B	4	
Nominal constant	0·5	1·0	3·0	5·0	10·0	cS/s
Viscosity range, approx.	100–500	200–1000	600–3000	1000–5000	2000–10,000	cS

All, Dozen £26. 10. 0. Each £2. 8. 0. *a*

VS-295

VISCOMETERS, SUSPENDED LEVEL, *Technico*, as VS-290 but with **works certificate** ... ... Each £6. 0. 0. *a*

VS-297

VISCOMETERS, SUSPENDED LEVEL, *Technico*, as VS-290 but with **NPL certificate** ... ... Each £12. 17. 6. *a*

When ordering VS-295 and VS-297 please state viscometer size required.

All items on this page normally available from stock.

Technico CANNON—FENSKE VISCOMETERS

REGD. TRADE MARK

Type BS/IP/CF

VS-310

VISCOMETERS, CANNON-FENSKE, *Technico*, Cannon-Fenske routine to ASTM D445–IP 71 and ASTM D2515, and type BS/IP/CF to BS 188.

Viscometer size	25	50	100	150	200	300	
Nominal constant	0·002	0·004	0·015	0·035	0·1	0·25	cS/s
Viscosity range, approx.	0·4–1·6	0·8–3·2	3–12	7–28	20–80	50–200	cS

All, Dozen **£24.10. 0.** Each **£2. 5. 0.** *a*

Viscometer size	350	400	450	500	600	
Nominal constant	0·5	1·2	2·5	8	20	cS/s
Viscosity range, approx.	100–400	240–960	500–2,000	1,600–6,400	4,000–16,000	cS

All, Dozen **£24.10. 0.** Each **£2. 5. 0.** *a*

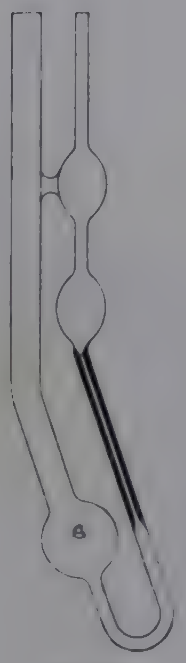
VS-315

VISCOMETERS, CANNON-FENSKE, *Technico*, as VS-310 but with **works certificate** ... ... Each **£5.17. 0.** *a*

VS-317

VISCOMETERS, CANNON-FENSKE, *Technico*, as VS-310 but with **NPL certificate** ... ... Each **£12.14. 6.** *a*

When ordering VS-315 and VS-317 please state viscometer size required.



VS-310

Technico MASTER U—TUBE VISCOMETERS

REGD. TRADE MARK

VS-340

VISCOMETER, MASTER U-TUBE, *Technico*, type BS/IP/MV, to BS 188. Each **£3.12. 0.** *a*

VS-350

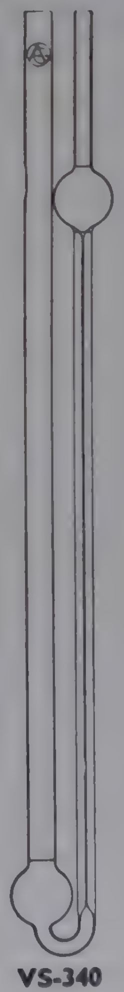
VISCOMETER, MASTER SUSPENDED LEVEL, *Technico*, type BS/IP/SL/MV, to BS 188 ... ... Each **£4. 4. 0.** *a*

THERMOSTATIC BATH and viscometer holders suitable for Master Viscometers, details on application.

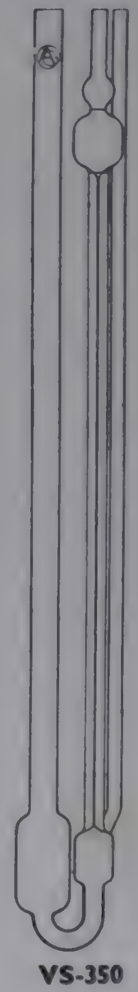
Dust in Capillary Viscometers

It is perhaps not well known that dust particles are often responsible for poor results from viscometers with constants of 0·3 cS/sec or less. An effective cure for the trouble is to filter all washing solvents and all samples through Ⓐ fritted glass filters of porosity grade 1. Clean viscometers must be kept covered and our laboratories report that during use a short length of 1 mm bore glass tubing attached by rubber tubing prevents the ingress of dust. Dust particles are difficult to see but fortunately most are doubly refracting. Thus they become clearly visible when the sample containing them is viewed between crossed Polaroid film sheets.

For good repeatable viscometry the apparatus must be clean. Satisfactory cleaning can be achieved using Cleansing Fluid CM-751 and Ultrasonic Bath UL-100.



VS-340



VS-350

All items on this page normally available from stock.

Gallenkamp VISCOMETER BATH

For the determination of kinematic viscosity by capillary viscometer methods including those specified in ASTM D445—IP71, BS 188, DIN 51550 and 51562. Also for any other methods involving the precise measurement of viscosity such as control of polymer molecular weight by specific or relative viscosity measurement.

Gallenkamp
VISCOMETER BATH

VS-615 with accessories

- **Unique turntable holder permits each viscometer to be brought to the front as required**
- **Workspace illuminated brilliantly but without glare**
- **Temperature controlled with maximum precision**
- **Designed for easy cleaning and simple maintenance**
- **Built-in boost for initial heating**
- **Suitable for use up to 120°C (250°F)**

PERFORMANCE AND OPERATION

Overall temperature range	Ambient (with cooling coil) to 120°C
Temperature fluctuation Up to 40°C Up to 100°C	±0·005°C ±0·015°C

To minimise temperature fluctuations resulting from thermostat switching, two energy input controls are provided. Coarse control is by a switch which selects suitable circuits for low and high temperature operation respectively; fine control is by a variable autotransformer.

Thermostatic control is by contact thermometers which have short ranges to suit all the common standard test temperatures.

Contact thermometer range	To suit test temperatures
27°F— 37°F	0°C
60°F— 80°F	20°C, 25°C, 70°F
80°F—110°F	100°F
115°F—135°F	50°C, 130°F
125°F—145°F	60°C, 140°F
195°F—215°F	100°C, 200°F, 210°F

For operation at temperatures within the overall range of the viscometer bath but outside the ranges tabulated above, contact thermometers are available to special order.

CONSTRUCTION

The viscometer bath is a compact and completely self-contained unit comprising a borosilicate glass tank, with a sand blasted diffusion area at the rear. The tank is enclosed in a grey stoved enamel finished steel case with levelling feet. The case, which has a white interior, is fitted with a toughened glass front window and a laminated plastics top. A freely moving annular turntable with positions for eight viscometer holders is built into the top and permits each viscometer as required to be brought to the front without disturbance. Blank covers are available for turntable positions not in use. The thermo-regulating unit is supported over the centre of the bath by a cantilever from the rear of the top cover. All electrical controls are mounted on a drawer chassis in the lower part of the case beneath the bath. The fluorescent lamp is mounted on the rear panel of the case behind the diffused panel of the glass tank.

NOTE: For temperatures up to 60°C water is a suitable bath liquid but for continuous working above this temperature ethylene glycol or white mineral oil may be used to advantage.

DIMENSIONS

	H	W	D
Overall	73 ×	50 ×	40 cm
	29 ×	20 ×	16 in

Power rating, max. 1000W.

Gallenkamp VISCOMETER BATH

VS-615

VISCOMETER BATH, thermostatic, *Gallenkamp*, for operation up to 250°F, as specification, comprising cylindrical borosilicate glass tank, fluorescent lamp, stirring motor and paddle, viscometer turntable, control and boost heaters and variable autotransformer. **Without viscometers, viscometer holders, contact thermometer or measuring thermometer.** For single phase supplies only.

220/240V 50 Hz	Each	£183. 0. 0.	*b*
200/210V 50 Hz	Each	£183. 0. 0.	*bN*
110/120V 60 Hz	Each	£188. 0. 0.	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

VS-620	**Heater,** 500W, long, for normal heating.	Each	£5. 10. 0.	*b*
VS-621	**Heater,** 500W, short, for boost heating.	Each	£4. 16. 0.	*b*
OD-124	**Stirrer motor.** For price see entry in List No. sequence.			
VS-627	**Tank,** borosilicate glass, with diffusing panel.	Each	£11. 5. 0.	*m*
VS-629	**Lamp,** fluorescent, 8W	Each	£0. 9. 2.	*m*
EB-120	**Fuse,** 5A, 2 required. For price see entry in List No. sequence.			

When ordering replacement parts please state serial number of viscometer bath and supply voltage.

ACCESSORIES

Four types of viscometer holders are listed which between them can accommodate the most popular range of viscometers described in BS 188 and ASTM D445–IP 71. Types of viscometer for which the four holders are suitable are shown in the table below.

VS-630	**Viscometer holder**	Each	£2. 7. 0.	*b*
VS-632	**Viscometer holder**	Each	£2. 7. 0.	*b*
VS-633	**Viscometer holder**	Each	£2. 7. 0.	*b*
VS-634	**Viscometer holder**	Each	£2. 7. 0.	*b*
VS-638	**Blank cover**	Each	£0. 17. 6.	*b*

***VS-639** **Contact thermometers,** with connector.

Range	27–37	60–80	80–110°F	
Each	£8. 0. 0.	£8. 0. 0.	£8. 0. 0.	*c*
Range	115–135	125–145	195–215°F	
Each	£8. 0. 0.	£8. 0. 0.	£8. 0. 0.	*c*

Contact thermometers of any other required range are available. Details on request.

Indicating thermometers, IP Kin Visc, see TK-546 to TK-561, TK-620 and TK-621 in List No. sequence.

VS-641 **Cooling coil,** for operating bath below or near to ambient temperature. With connections for 8–9 mm bore flexible tubing ... ... Each £2. 2. 6. *b*

LX-110 **Lubricant,** suitable for stirrer motor. For price see entry in List No. sequence.

U-TUBE VISCOMETERS to IP, BS and ASTM specifications see VS-220 to VS-350 on pages 799 to 801.

Viscometer Holder List No.	Suitable for Viscometers				
	List No.	Sizes	Specification	Description	Type
VS-630	VS-220	All	ASTM D445–IP 71 ASTM D2515 BS 188	U-tube U-tube	BS/IP BS/U
	VS-280	1–4	ASTM D445–IP 71 ASTM D2515, BS 188	Suspended level	BS/IP/SL
VS-632	VS-280	4A and 5	ASTM D445–IP 71 ASTM D 2515, BS 188	Suspended level	BS/IP/SL
VS-633	VS-290	All	ASTM D445–IP 71 ASTM D2515	Suspended level	Ubbelohde
VS-634	VS-250	All	ASTM D445–IP 71 ASTM D2515 BS 188	Reverse flow Reverse flow	BS/IP U-tube BS/IP/RF
	VS-310	All	ASTM D445–IP 71 ASTM D2515 BS 188	Cannon-Fenske Cannon-Fenske	Routine BS/IP/CF

Items on this page normally available from stock except those coded *N*.

Gallenkamp HIGH TEMPERATURE VISCOMETER BATH

For viscosity determinations at temperatures between 30 and 250°C

VS-670 with accessories

- Dewar pattern bath—minimum heat wastage
- Insulated top with holes to accept two viscometer holders
- Workspace illuminated brilliantly but without glare
- Temperature controlled with maximum precision
- Designed for easy cleaning and simple maintenance
- Built-in boost for initial heating

PERFORMANCE AND OPERATION

Temperature ranges:	
using water	Ambient +10°C to 60°C
using white oil	60°C to 120°C
using silicone oil	120°C to 250°C
Temperature fluctuation	±0·025°C
Heating time to 250°C	2½ hours

To minimise temperature fluctuations resulting from thermostat switching, two energy input controls are provided. Coarse control is by a switch which selects suitable circuits for low and high temperature operation respectively; fine control is by a variable auto-transformer.

Thermostatic control is by contact thermometer. A contact thermometer range 0–250°C is available but, to obtain the minimum fluctuation a narrow range (25°C) thermometer is recommended. Nine of these covering adjacent ranges from 25–50°C up to 225–250°C are offered.

CONSTRUCTION

The viscometer bath is a Dewar flask, internally silvered apart from two clear strips at the front and back for illuminating and viewing the viscometers. The bath is housed in a grey stoved enamel finished steel case with a toughened glass front window, asbestos lined laminated plastics top and levelling feet. The top cover has holes to accept two purpose-made viscometer holders with insulated tops. When not in use, these may be replaced by insulated blank covers. The thermoregulating unit is supported over the centre of the bath by a cantilever from the rear of the top cover. All electrical controls are mounted on a drawer chassis in the lower part of the case beneath the bath. The fluorescent lamp is situated behind the bath, on the rear panel of the case.

DIMENSIONS

	H	W	D
Overall	82 ×	50 ×	40 cm
	32 ×	20 ×	16 in

Gallenkamp HIGH TEMPERATURE VISCOMETER BATH

View of control chassis of *Gallenkamp* Viscometer Bath showing transistorised relay used for switching energy to the heater.

VS-670

VISCOMETER BATH, thermostatic, high temperature, *Gallenkamp*, for operation up to 250°C, as specification with cylindrical Dewar bath, fluorescent lamp, stirring motor and paddle, insulated covers for test positions, control and boost heaters and variable autotransformer. **Without viscometers, viscometer holders, contact thermometers, measuring thermometer or filling liquid.** For single phase supplies only.

220/240V 50 Hz	Each **£286. 0. 0.**	*b*
200/210V 50 Hz	Each **£286. 0. 0.**	*bN*
110/120V 60 Hz	Each **£290. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

VS-672	**Bath, Dewar**	Each **£8.15. 0.** *b*
VS-620	**Heater,** 500W, long, for normal heating	For prices see entries in List No. sequence
VS-621	**Heater,** 500W, short, for boost heating	
OD-124	**Stirrer motor**	
VS-629	**Lamp,** fluorescent, 8W	
EB-120	**Fuse,** 5A, 2 required	

When ordering replacement parts please state serial number of viscometer bath and supply voltage.

ACCESSORIES

The list of accessories includes contact thermometers, viscometer holders, and special viscometers with extended limbs. Due to the variety of different sizes and types of viscometers it is not practicable to hold stocks but any type can be made to special order to suit the viscometer bath.

VS-685 **Contact thermometer,** long range 0–250°C with lead and plug ... ... Each **£12. 0. 0.** *b*

VS-680 **Contact thermometers,** short range as follows: 25–50°C, 50–75°C, 75–100°C, 100–125°C, 125–150°C, 150–175°C, 175–200°C, 200–225°C, 225–250°C. Each **£14. 0. 0.** *b*

When ordering please state range or ranges required.

VS-690 **Viscometer holders,** with insulated tops. Each **£11.17. 6.** *b*

When ordering please state size and type of viscometer to be used.

Viscometers with extended limbs, price on receipt of details of type, sizes and quantities required.

LX-110 **Lubricant,** suitable for stirrer motor. For price see entry in List No. sequence.

Gallenkamp LOW TEMPERATURE VISCOMETER BATH

Refrigerated model for −40°C to +40°C

Gallenkamp have been called upon to manufacture a number of viscometer baths for use in this temperature range. The baths have positions for two viscometers and in most other repects resemble the high temperature bath VS-670. An electrical refrigeration unit makes the whole bath independent of conventional coolants such as solid carbon dioxide etc. Full details and prices sent on request.

Items on this page normally available from stock except those coded *N*.

Technico VOLUMETRIC GLASSWARE

REGD. TRADE MARK

All *Technico* volumetric glassware is manufactured in our own works using modern precision machines and strictly controlled methods approved by the National Physical Laboratory. This picture shows part of the test room where every piece is calibrated either volumetrically or gravimetrically against standards of the highest accuracy.

BRITISH STANDARDS

All articles for which British Standards (BS) exist are manufactured to such standards, the remainder being made to our own stringent specifications. Our aim is always to offer the highest possible quality at a competitive price.

Most British Standards for volumetric glassware have been revised to bring them into line with improved modern practice and with the requirements of the International Organisation for Standardization (ISO).

UNIT OF CAPACITY

With the adoption of the SI system of units, the 1901 definition of the litre was abandoned. The term litre is now a synonym for the cubic decimetre but should not be associated with high precision measurements.

For volumetric glassware the difference between the old and new units is only of marginal significance on a 2000 cm^3 flask where it amounts to about 10% of the Class A tolerance. British Standards now permit inscriptions in 'ml' or 'cm^3'. In order to emphasise the 'precision instrument' quality of *Technico* glassware the symbol cm^3 is now used.

Details of the SI system and the reasons which led to its adoption will be found in BS 3763.

STANDARD TEMPERATURE

All British Standards specify a temperature of 20°C as standard for volumetric glassware except that in accordance with ISO recommendations an alternative temperature of 27°C is permitted for use in tropical countries.

In actual fact with borosilicate glass the calibration temperature is quite immaterial at any working temperature provided that all solutions and instruments are at the same temperature. The following table shows that the worst error introduced by a 7°C difference is barely one quarter of the class A tolerance on a 2000 cm^3 flask and considerably less on all other articles.

This table shows the change in capacity, expressed as a percentage of the Class A tolerance, of a borosilicate glass vessel standardised at 20°C and used at 27°C. For soda-lime glass vessels the percentage figures should be multiplied by three.

Nominal capacity cm^3	Burettes	Cylinders	Flasks	Bulb pipettes	Divided pipettes
1	—	—	—	1%	1%
2	—	—	—	2%	2%
5	2%	1%	—	2%	2%
10	4%	1%	4%	4%	3%
25	6%	1%	6%	6%	4%
50	7%	1%	7%	9%	—
100	8%	1%	9%	12%	—
250	—	2%	11%	—	—
500	—	2%	14%	—	—
1000	—	2%	18%	—	—
2000	—	2%	23%	—	—

WORKING TEMPERATURE

It has been shown in the preceding paragraph that a working temperature different from the calibration temperature has no significant effect on the capacity of borosilicate glass vessels.

The effect of temperature on the liquids in such vessels is, however, of vital importance for accurate work. The dilute aqueous solutions commonly used in analytical work have a coefficient of expansion of the order of 1 part in 5000 per degree C, i.e. 20 times as great as that of the glass vessel. The effect of this is illustrated in the table below.

This table shows the change of temperature of the liquid contents of a vessel which will cause an error equal to the Class A tolerance. Cylinders and small sizes of other articles are omitted as the change is more than 10°C and thus unlikely to occur.

Nominal capacity cm^3	Burettes	Flasks	Bulb pipettes	Divided pipettes
10	9°C	9°C	9°C	12°C
25	6°C	6°C	6°C	9°C
50	5°C	5°C	4°C	—
100	4°C	4°C	3°C	—
250	—	3°C	—	—
500	—	2·5°C	—	—
1000	—	2°C	—	—
2000	—	1·5°C	—	—

When ordering, specify *Technico* volumetric glassware and insist on receiving apparatus bearing our registered trade mark.

Technico VOLUMETRIC GLASSWARE

REGD. TRADE MARK

QUALITY

In recent years we have been pleased to note the increasing appreciation of users of the vital importance of high quality and accuracy in the apparatus they employ, it now being generally accepted that volumetric glassware is a 'precision instrument' of the analytical chemist and that 'cheap' non-standard specification glassware is a false economy.

As a result of our manufacturing policy, *Technico* volumetric glassware enjoys both in the U.K. and overseas, a reputation second to none for quality and accuracy.

GRAVIMETRIC CALIBRATION

Technico Class A articles and a random sampling of those in Class B are checked by gravimetric calibration using BS 1797 'Tables for use in the calibration of volumetric glassware'. These tables provide correction figures for variations of temperature and barometric pressure and enable weight in grammes to be converted into capacity in cubic centimetres. Such tables are useful in any laboratory where accurate checking of volumetric glassware is carried out.

GRADES OF ACCURACY

Most items of *Technico* volumetric glassware are available as follows:—

Technico BST stamped Class A.

REGD. TRADE MARK

Is primarily used for referee purposes, is marked with the BST monogram which supersedes the former NPL marking and is supplied complete with test certificate showing the value of any corrections to be applied.

Technico Class A.

REGD. TRADE MARK

Is available with or without works certificate and is of similar quality to the BST grade and equally suitable for work of the highest degree of accuracy. It meets all BS requirements for Class A and works certificates are issued on the basis of NPL approved methods of test which in the case of divided scale articles, give measured values at 5 test points. All corrections are given to the same degree of accuracy as on the corresponding BST certificates.

Technico Class B.

REGD. TRADE MARK

Is manufactured to BS Class B requirements to provide a reliable quality for routine work where the highest accuracy is unnecessary.

INSCRIPTIONS

All *Technico* volumetric glassware carries full inscriptions as required by the appropriate British Standard.

In accordance with ISO recommendations, recently revised British Standards recommend the use of 'In' instead of 'C' on flasks and other articles calibrated to contain a stated capacity, and 'Ex' instead of 'D' on burettes, pipettes etc., calibrated to deliver a stated capacity. These abbreviations are designed to minimise language difficulties in non-English speaking countries and have been adopted on all *Technico* volumetric glassware.

CLEANLINESS

In order to obtain accurate results from volumetric glassware it is essential that it be thoroughly clean and free from grease. A distorted meniscus or irregular drainage from the walls can have a serious effect on accuracy, particularly on articles calibrated for delivery. Organic solvents, sulphuric acid-dichromate mixture or modern detergents are among the most effective materials for cleaning.

Most *Technico* volumetric Class B glassware now has graduations and inscriptions applied as a dark brown stain which is completely resistant to all reagents except those which attack the glass itself. The white enamel used on other items is the most resistant available but cannot be guaranteed not to discolour by repeated immersion in acid-dichromate mixture. Such articles should be filled with the mixture rather than immersed in it. In all cases glassware should be thoroughly rinsed with distilled water after cleaning and also after use. If allowed to dry after being wetted with hard water or chemical solutions, stains may be formed inside which are often very difficult to remove.

STOPCOCKS

All stopcocks on *Technico* volumetric glassware are ground to a high quality finish and are fitted with rust-resistant retaining springs which minimise the chances of error, loss or breakage. Interchangeable stopcocks of *Gallenkamp* high quality manufacture are fitted to many types of *Technico* burettes and can be supplied to order on many other articles.

Lubrication of stopcocks on articles of volumetric glassware is an operation requiring care. Only a minimum of lubricating grease should be smeared evenly over the surface of the key. If an excess is used it is likely to obstruct the bore and can also obstruct the jet of a burette. The aggravating loss of time which this causes is less important than the loss of accuracy due to an incorrect rate of flow.

Silicone grease should NEVER be used on stopcocks on volumetric glassware because during use it 'migrates' and contaminates the inner surface of the glass. Such contamination prevents wetting of the glass, distorts the meniscus, alters drainage and thus destroys accuracy.

METHODS OF USE

In order to obtain the most accurate results from volumetric glassware it is desirable that the method of use should be as nearly as possible the same as the method by which the article was originally calibrated. Methods of verification are detailed in all BS and in most instances provide a valuable guide to the best method of use. There is one significant factor affecting accuracy in which the method has been changed in two specifications. This is in relation to the customary 15 sec drainage time formerly allowed for bulb pipettes to BS 1583 and type II divided pipettes to BS 700. Experimental investigation in connection with ISO work showed that equal accuracy is obtained by having a slightly longer delivery time and cutting the drainage time to a nominal 3 sec. A slight overall saving of time is achieved and removes the necessity of timing 15 sec drainage. All *Technico* pipettes are made to the modern standard.

Much useful information on accuracy and methods of use will be found in

Notes on Applied Science No. 6, Volumetric Glassware, 1954, Her Majesty's Stationery Office.

Microdiffusion Analysis and Volumetric Error by E. J. Conway, M.B., D.Sc., F.R.S.

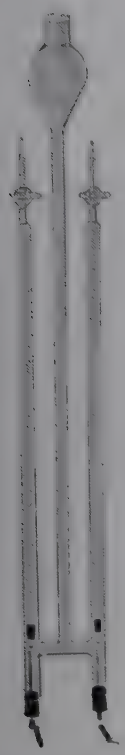
When ordering, specify *Technico* volumetric glassware and insist on receiving apparatus bearing our registered trade mark.

VOLTAMETER

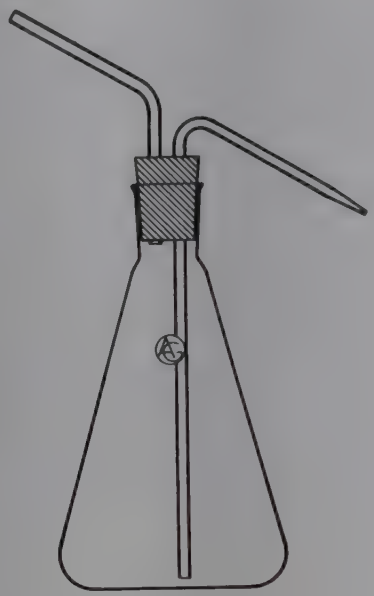
VX-022

VOLTAMETER, electrolytic, Hofmann, for demonstration of electrolysis of water and dilute acids and measurement of the products of dissociation. With two limbs graduated 50 cm³ in 0·2 cm³, two straight bore stopcocks but without electrodes ... Each **£3. 11. 6.** *c*

VX-023 **Electrodes, platinum,** mounted with stoppers for voltameter VX-022 ... ... Pair **£1. 14. 0.** *c*



VX-022 with VX-023



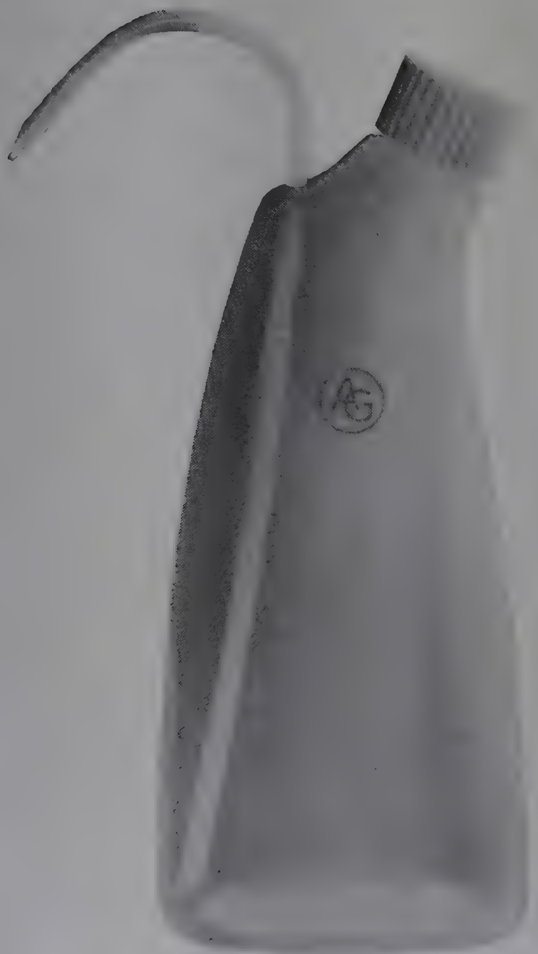
WB-040

GLASS WASHBOTTLE

WB-040

WASHBOTTLES, (AG), **borosilicate glass,** with rubber stopper and bent tubes, one drawn to a fine jet. Capacity 500 ml ... ... Dozen **£4. 4. 0.** Each **£0. 8. 0.** *b*

Gallenkamp POLYTHENE WASHBOTTLES



WB-100

A streamlined design of squeeze bottle, easy to handle and control. The positive seal cap is readily released and is supplied only in white polythene. Supplementary caps are available in four other colours if required for colour coding. The larger bottle holds a full Imperial pint.

- Elegant but functional
- Stand firmly on the bench
- Come naturally to the hand
- Deliver a powerful, clean jet
- Refill without tilting or removing jet
- Stepped bore for adjusting jet diameter

WB-100

WASHBOTTLES, *Gallenkamp*, **polythene.**

Capacity	250	600 ml	
Dozen	**34/–**	**56/–**	*b*
Each	**4/4**	**6/–**	

WB-105 **Caps, coloured polythene,** for colour coding above bottles. Available in red, blue, green or yellow in packs of one dozen of one colour or one dozen assorted 3 each of 4 colours.
Dozen packs **£1. 19. 0.** Pack **£0. 4. 8.** *b*

When ordering please state colour required.

All items on this page normally available from stock.

WASHING EQUIPMENT

WD-020

BOTTLE WASHER, for thoroughly rinsing the interiors of bottles with neck diameter between 9·5 mm and 10 cm at an approximate rate of 600/hour. Comprises a spring loaded nozzle mounted on a rigid base with a length of 3-ply hose and a tap adapter. The sloping top surface of the distributor is channelled to allow water to flow away and is fitted with four plastics coated sidearms to support larger bottle necks ... Each **£8. 5. 0.** *f*

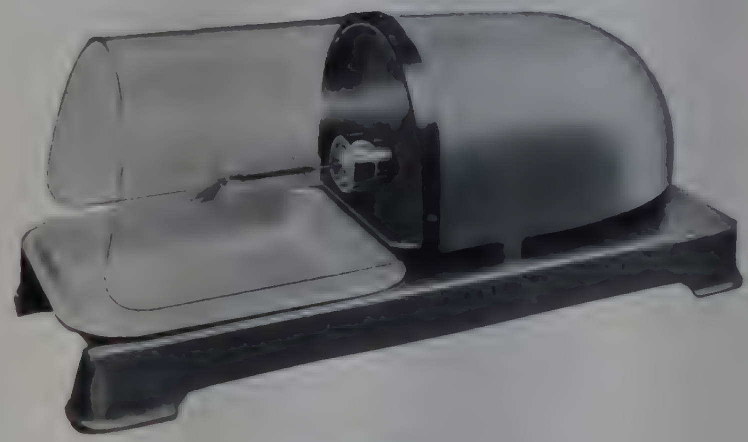
ACCESSORY

WD-028 **Nozzle,** for test tubes and syringes, with four plastics coated sidearms ... ... Each £1. 13. 6. *f*

WD-020

WD-050

WASHING MACHINE, electrically operated, with a quick release chuck taking a wide variety of interchangeable nylon brushes for cleaning syringes, test tubes and round bottles up to 250 ml. Mounted on a cast aluminium base with a Perspex anti-splash shield, a white enamelled tray and incorporating a $\frac{1}{16}$ hp motor for 200/250V 50 Hz single phase supplies. Dimensions 62·5×27×25 cm. **Without brushes** ... ... Each **£59. 0. 0.** *m*



WD-050

ACCESSORIES

WD-060 **Brushes,** nylon, for round bottles.

Capacity	30	120	250 ml	
Dozen	46/–	56/–	59/–	*m*

WD-064 **Brushes,** nylon, for test tubes.

Diameter	8	11	14	19	22	25 mm	
Dozen	39/–	40/–	41/–	42/–	43/–	43/6	*m*

AUTOMATIC PIPETTE WASHERS. The washers connect to a steady water supply and a siphoning device empties them at regular intervals, thereby thoroughly rinsing the contents. A container is supplied for soaking pipettes in a cleansing agent before washing. For suitable detergents see CLEANING MATERIALS.

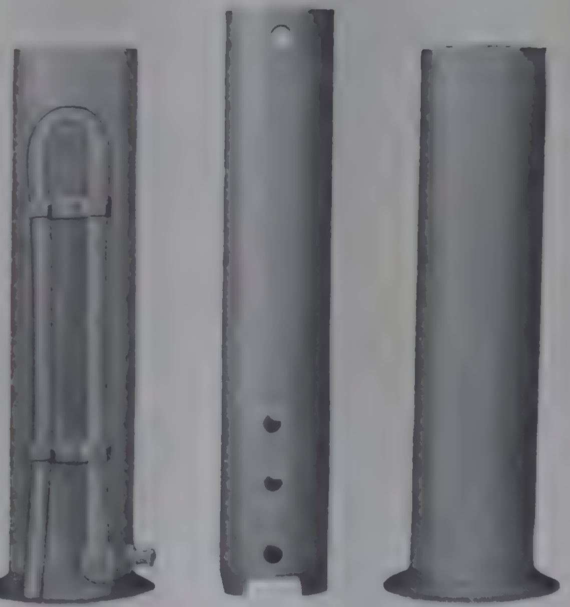
WD-110

PIPETTE WASHER, automatic, polythene, as above specification, consisting of washer with siphon, one basket and one container.

Size No.	1	2	3	
Diam. × height	10×46 4×18	15×46 6×18	15×68 cm 6×27 in.	
Max. pipette length immersed	38	38	60 cm	
Each	£5. 6. 0.	£8. 12. 0.	£10. 6. 0.	*m*

COMPONENTS

Size No.			1	2	3	
WD-112	**Washer**	Each	£2. 12. 0.	£4. 0. 0.	£4. 16. 0.	*m*
WD-114	**Basket**	Each	£1. 14. 0.	£2. 8. 0.	£2. 14. 0.	*m*
WD-116	**Container**	Each	£1. 0. 0.	£2. 4. 0.	£2. 16. 0.	*m*



WD-112 WD-114 WD-116

WD-110

WASHING EQUIPMENT

Other items of washing and drying equipment are listed elsewhere in this catalogue as below:

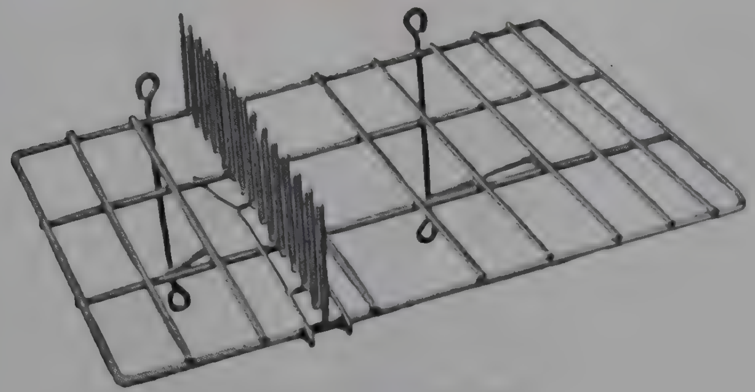
Peg draining rack	see FW-554
Draining mat, polythene	see MB-480
Drying ovens for glassware	see OV-880 and WD-190

All items on this page normally available from stock.

Gallenkamp DRAINING RACKS

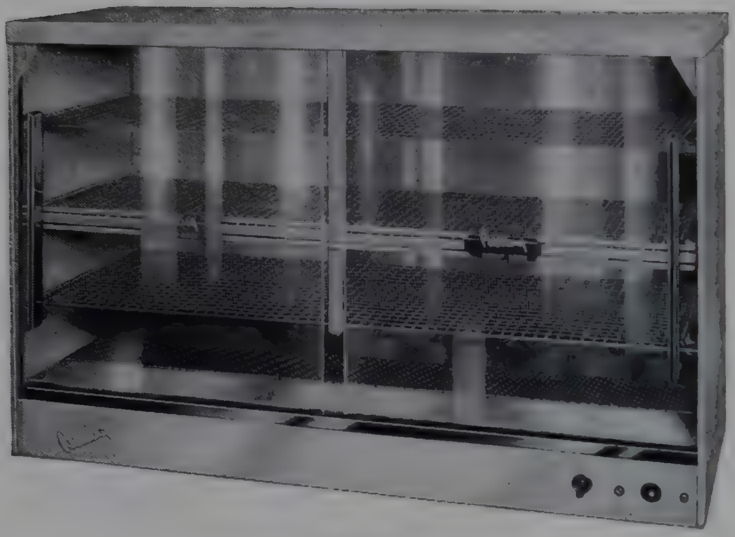
Welded steel draining racks coated with a thick layer of polythene forming a hard wearing, resilient surface which resists corrosion and prevents scratching of the glassware. The struts are so spaced that each rack will accommodate glassware of several different sizes and shapes. Both racks are fitted with support brackets for wall mounting.

List No.	Dimensions		Each	
	in	cm		
WD-170	18×12	46×30	**£2. 5. 0.**	c
WD-174	24×18	61×46	**£2. 12. 6.**	c



WD-174 with WD-180

WD-180
PEG ATTACHMENT, polythene coated, with 14 pegs and clips for attaching to draining racks WD-170 or WD-174 ... ... Each **£0. 18. 0.** c



WD-190

WD-190
DRYING CABINET, maximum temperature approx. 80°C. Comprises 20×31×13 in (51×79×33 cm) sheet steel cabinet heated by 600W grid elements, with three wire mesh shelves providing total shelf area of 6·9 ft² (6390 cm²). With sliding glass doors, indicator lamp and power controller with OFF position. For 230/240V a.c. supplies ... ... Each **£22. 0. 0.** *m*

The drying cabinet is available for other voltages to order.

When ordering please state voltage and nature of supply.

Gallenkamp DRYING CABINET

A general purpose laboratory drying cabinet **for use up to 120°C.** Its many applications include the drying of glassware and sheets of chromatography paper up to 58×63 cm.

- Thermostatically controlled
- Large capacity
- Outlet for extraction ducting

For full details and prices see OV-880 in List No. sequence.

OV-880 with OV-892

All items on this page normally available from stock.

Gallenkamp
REGD. TRADE MARK

GLASSWARE DRYERS

For the rapid drying of laboratory glassware; especially items such as cylinders and flasks with narrow necks which are difficult to dry by other means.

The base of each dryer encloses a powerful electrically driven blower. This draws room air through a filter, passes it through a heater and forces it through the apparatus support tube which has a number of holes near its top to ensure a good distribution of the air over the inside of the apparatus. Three interchangeable apparatus support tubes of 9·5, 16 and 25 mm outside diameter are supplied with the single point apparatus. The twelve point apparatus is supplied with 23 cm long 18 mm diameter general purpose tubes. Because the air is not recirculated a maximum drying rate is obtained. Both dryers are fitted with safety thermostats to protect them from overheating due to accidental interruption of the air circulation. A switch in the heater circuit enables cold air to be circulated if required.

WD-200

WD-200

GLASSWARE DRYER, *Gallenkamp*, single point, as specification. Overall height without tube, 28 cm, diameter 24 cm, power rating 200W. For 200/250V 50 Hz supplies ... ... Each **£20. 10. 0.** *b*

REPLACEMENT PART

WD-202 Heating element ... ... Each **£1. 0. 0.** *b*

ACCESSORY

WD-205 Flexible tube, 90 cm long for blowing air into large vessels ... ... Each **£1. 7. 0.** *b*

WD-215

WD-215

GLASSWARE DRYER, *Gallenkamp*, 12 point, as specification. Overall height without tubes, 28 cm, diameter 35 cm, power rating 1000W. For 200/250V 50 Hz supplies ... ... Each **£43. 0. 0.** *b*

REPLACEMENT PART

WD-216 Heating element ... ... Each **£1. 13. 0.** *b*

ACCESSORY

WD-218 Apparatus support tube, 75 mm long × 11 mm dia. with air outlets at top and sides to fit in place of standard general purpose tubes. Dozen **£7. 5. 0.** Each **£0. 13. 3.** *b*

When ordering please state voltage and nature of supply.

WASTE DISPOSAL

WD-400

WASTE BIN, plastics. A large capacity, hygienic receptacle fitted with a removable cover for easy emptying. The cover has a rocking flap through which waste material is admitted. Overall dimensions 70 cm high × 32 cm × 32 cm ... ... Each **£1. 17. 6.** *m*

WD-425

WASTE BINS, polythene, circular, complete with lid.

Capacity, approx.	35	70	90 litres	
Diameter at top	36	47	48 cm	
Height	38	51	60 cm	
Each	**34/-**	**40/-**	**56/-**	c

WD-400

WD-425

All items on this page normally available from stock.

WD-440
with sack

WD-441
with sack

WD-450
with sack

WD-455
with sack

SPECIMEN DISPOSER

A powerful electrically driven grinder and shredder which enables waste tissue from pathological specimens rapidly to be disintegrated and flushed away. For full details see WD-500 et seq. listed in catalogue 'Laboratory Furniture and Fittings', a copy of which will be sent on request.

WATCH GLASSES adjusted to a predetermined weight of 10 or 20 grammes within ±1 mg for use on analytical balances, see BA-974 in List No. sequence.

WASTE SACKS AND HOLDERS

The advantage of disposable sack refuse disposal is that when full, the sack is simply detached, closed and taken away—and a clean, fresh sack is fitted. The tough, wet-strength sacks listed are particularly easy to handle; only the weight of the contents is carried—no heavy bin. Sacks are held by strong metal holders with lids which close over the tops of the fitted sacks.

WD-440
WASTE SACK HOLDER, small size. A free-standing holder with lightweight pedal-operated lid. The tubular stand is finished in white stove enamel and is small enough to slide under laboratory benches. Overall dimensions (lid closed) 40 × 30 × 68 cm high. **Without sacks** ... ... Each **£5. 5. 0.** *m*

WD-441
WASTE SACK HOLDER, as WD-440 including lid, but for mounting on walls or the ends of benches. **Without sacks** ... ... Each **£2. 17. 0.** *m*

ACCESSORIES

WD-442	**Waste sacks,** polythene light duty, 60 × 28 cm.	Pack of 100	**£1. 3. 6.**	*m*
WD-444	**Waste sacks,** 1-ply kraft, 60 × 28 cm.	Pack of 50	**£1. 3. 6.**	*m*

WD-450
WASTE SACK HOLDER, large size, wall-mounted. A strong metal frame with lid. **Without sacks.** Each **£3. 16. 0.** *m*

WD-455
WASTE SACK HOLDER, mobile. A strong metal frame trolley with pedal for opening the lid. **Without sacks** ... ... Each **£8. 0. 0.** *m*

ACCESSORIES

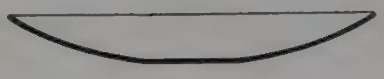
WD-458	**Waste sacks,** polythene, 100 × 33 cm.	Pack of 100	**£4. 2. 0.**	*m*
WD-460	**Waste sacks,** 2-ply high wet strength kraft, 100 × 36 × 20 cm	Pack of 50	**£2. 8. 0.**	*m*

WATCH GLASSES

***WE-025**
WATCH GLASSES, thin clear glass, edges ground. Supplied in packs of ten.

Diameter	5	6·5	7·5	9 cm	
Ten packs	**58/–**	**70/–**	**82/–**	**94/–**	c
Pack	**7/–**	**8/–**	**9/3**	**10/3**	

Diameter	10	12·5	15	20 cm	
Ten packs	**108/–**	**180/–**	**220/–**	**380/–**	c
Pack	**11/9**	**19/6**	**24/–**	**41/–**	



WE-050

***WE-050**
WATCH GLASSES, stout clear glass, with flat polished bottom. Supplied in packs of ten.

Diameter	5	6·5 cm	
Ten packs	**118/–**	**130/3**	c
Pack	**12/9**	**14/–**	

WE-060

WE-060
WATCH GLASSES, *Pyrex brand* glass.

Diameter	2·5	5	7·5	10	12·5	15 cm	
Std. pack. qty.	36	36	144	144	72	72	
Std. pack	**113/–**	**121/–**	**561/–**	**605/–**	**345/–**	**405/–**	d
Dozen	**39/–**	**42/–**	**51/–**	**55/–**	**62/–**	**72/–**	
Each	**4/8**	**4/11**	**5/8**	**6/–**	**6/4**	**7/2**	

All items on this page normally available from stock.

WATER BATHS

A range of simple, inexpensive water baths, especially suitable for educational use, manufactured of light gauge aluminium for convenience in handling and for rapid heating.

WF-020

WATER BATH, for gas heating, aluminium, 12·5 cm (5 in) diameter, 9 cm (3½ in) deep. With two handles and set of aluminium rings.
Dozen **£10. 10. 0.** Each **£0. 19. 0.** c

WF-030

WATER BATH, for gas heating, anodised aluminium, 20 cm (8 in) diameter, 11·5 cm (4½ in) deep. With two plastics heat resisting handles and set of aluminium rings. Dozen **£30. 0. 0.** Each **£2. 15. 0.** b

WF-040

WATER BATH, as WF-030 but with constant level device fitted ... Dozen **£36. 0. 0.** Each **£3. 5. 0.** b

ACCESSORY

WF-042 Tripod stand with positioning rim. Suitable for WF-030 and WF-040.
Dozen £8. 5. 0. Each £0. 15. 0. b

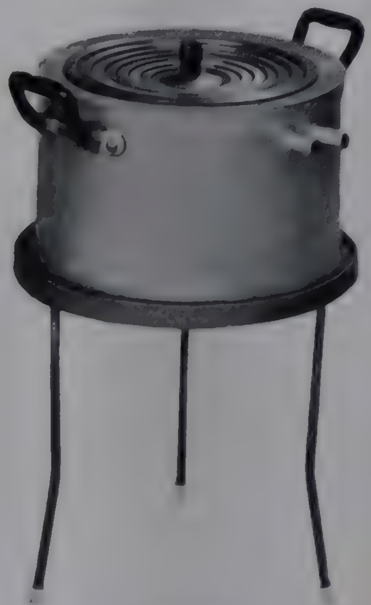
WF-050

WATER BATH, electrically heated, anodised aluminium, 20 cm (8 in) diameter, 11·5 cm (4½ in) deep. The 1000W heater incorporates a device which limits its temperature to a safe low value in the event of the bath boiling dry. With constant level device, plastics heat resisting feet and set of aluminium rings. Fitted with 120 cm (4 ft) mains cable. For 220/240V a.c. supplies only.
Dozen **£82. 0. 0.** Each **£7. 10. 0.** b

REPLACEMENT PART

WF-052 Heating element, 1000W, with plug and mains cable.
Each £2. 5. 0. b

WF-020


WF-040
with WF-042

WF-050

Gallenkamp SINGLE PLACE WATER OR STEAM BATHS

WITH BUILT-IN ELECTRIC HEATING

For safe, reliable long term digestion, evaporation, etc.

WF-150

WATER BATH, *Gallenkamp*, cast aluminium alloy, grey stoved enamel finish exterior. Dimensions: internal **20 cm diameter** × 14·5 cm deep. With built-in 750W electric heater, constant level device and a set of stainless steel rings WF-290. The heater incorporates a device which limits its temperature to a safe, low value in the event of the bath boiling dry. Fitted with 120 cm (4 ft) mains cable. For 220/240V a.c. supplies only.
Each **£13. 10. 0.** b

REPLACEMENT PART

WF-152 Heating element, 750W, with plug and mains cable.
Each £2. 12. 0. b

When ordering please state voltage and nature of supply.

WF-150

WF-190

WATER BATH, *Gallenkamp*, tinned spun copper, grey stoved enamel finish exterior. Dimensions: internal 25 cm diameter × 13 cm deep; overall height, 18 cm. With three legs, built-in 1500W electric heater, constant level device and set of concentric copper rings. The heater incorporates a device which limits its temperature to a safe, low value in the event of the bath boiling dry. Fitted with 120 cm (4 ft) mains cable. For 220/240V a.c. supplies only ... ... Each **£15. 0. 0.** b

REPLACEMENT PART

WF-194 Heating element, 1500W, with plug and mains cable.
Each £2. 5. 0. b

When ordering please state voltage and nature of supply.

WF-190

All items on this page normally available from stock.

Gallenkamp MULTIPLE PLACE WATER/STEAM BATHS

WITH BUILT-IN ELECTRIC HEATING

For performing replicate digestions or evaporations safely over long periods.

WF-200

WF-200

WATER BATH, *Gallenkamp*, **5-hole,** size 27×20×10 cm, with 750W electric heater and constant level device. The bath is an aluminium alloy casting finished in grey stoved enamel. The stainless steel cover has circular holes 10·1, 8·5, 6·9 cm and (two) 5·3 cm diameter each fitted with a set of stainless steel rings. The heater incorporates a thermostat device which limits its temperature to a safe value in the event of the bath boiling dry. With 3-core cable and connector.

For 220/240V a.c. supplies	Each	**£15. 10. 0.**	*b*
For 200/210V a.c. supplies	Each	**£15. 10. 0.**	*bN*
For 110/120V a.c. supplies	Each	**£15. 10. 0.**	*bN*

REPLACEMENT PARTS

WF-152 **Heating element ...**
WF-290 **Water bath rings ...**
} For details and prices see entries in List No. sequence.

WF-220

WF-220

WATER BATH, *Gallenkamp*, **stainless steel, 6-hole,** size 33×23×10 cm, with 750W electric heater and constant level device. The removable cover has 8·5 cm diameter holes, each fitted with a set of stainless steel rings. The heater incorporates a thermostat device which limits its temperature to a safe value in the event of the bath boiling dry. With 3-core cable and connector.

For 220/240V a.c. supplies	Each	**£20. 0. 0.**	*b*
For 200/210V a.c. supplies	Each	**£20. 0. 0.**	*bN*
For 110/120V a.c. supplies	Each	**£20. 0. 0.**	*bN*

REPLACEMENT PARTS

WF-152 **Heating element ...**
WF-290 **Water bath rings ...**
} For details and prices see entries in List No. sequence.

WF-250

WATER BATH, *Gallenkamp*, **stainless steel, 12-hole,** size 46×30×10 cm, with 1500W electric heater and constant level device. The removable cover has 8·5 cm diameter holes each fitted with a set of stainless steel rings. The heater incorporates a thermostat device which limits its temperature to a safe value in the event of the bath boiling dry. With 3-core cable and connector.

For 220/240V a.c. supplies	Each	**£26. 0. 0.**	*b*
For 200/210V a.c. supplies	Each	**£26. 0. 0.**	*bN*
For 110/120V a.c. supplies	Each	**£26. 0. 0.**	*bN*

REPLACEMENT PART

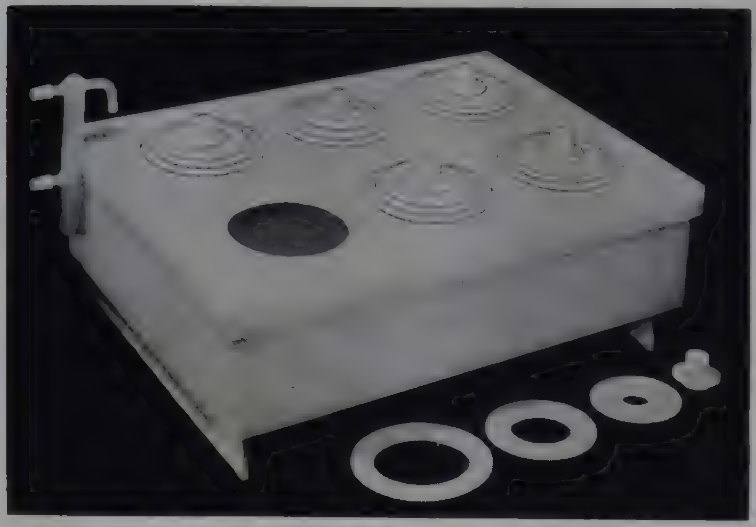
WF-252	**Heating element, 1500W** ...	Each	**£2. 15. 0.**	*b*

When ordering please state voltage.

REPLACEMENT RINGS FOR WF-200, WF-220 and WF-250.

WF-290 **Water bath rings,** *Gallenkamp*, **stainless steel; size 1 is the central cover with a knob.**

Size	1	2	3	4	5	6	7	8	
Ext. dia.	5·1	6·6	8·2	9·9	11·5	13·3	15·1	17·1 cm	
Int. dia.	—	3·8	5·3	6·9	8·5	10·1	11·9	13·1 cm	
Dozen	32/–	25/–	32/–	44/–	57/–	68/–	96/–	110/–	*b*
Each	4/2	3/8	4/2	5/–	6/–	6/10	9/–	10/–	



WF-300

WF-300

WATER BATH, polypropylene, 6-hole, size 50×31×10 cm, with 1500W electric heater and external constant level device. The cover, which is removable, has 10 cm holes each fitted with a set of polypropylene rings. The heater incorporates a connector which is ejected automatically in the event of the bath boiling dry. With 3-core cable and connector. For 230/250V a.c. supplies ... ... Each **£21. 5. 0.** *m*

REPLACEMENT PART

WF-302 **Heating element,** 1500W, complete with connector and lead. For 230/250V a.c. supplies. Each **£5. 16. 0** *m*

Control units for adjustment of boiling rate—see EC-750 et seq. in List No. sequence.

Items on this page normally available from stock except those coded *N*.

Gallenkamp GENERAL PURPOSE WATER BATH

10 LITRE CAPACITY WITH *Compenstat* CONTROL

For all applications requiring a compact reliable bath with close temperature control.

- **Stainless steel interior**
- **Compact design**
- **All metal construction**
- **Excellent performance**

PERFORMANCE AND CONTROLS

Temperature range	Ambient temperature +5°C to 100°C.
Temperature fluctuation	0·4°C (with water), 0·8°C (with oil).
Temperature variation	Less than 0·1°C.

NOTES: 1. For use above 50°C with water, the gabled cover should be fitted to minimise evaporation.

2. For use at or below ambient temperature, the cooling coil and a supply of cold water are necessary.

The controls comprise a mains on/off switch, load indicator lamp and a *Compenstat*, direct reading thermostat scaled 0–100°C in 5° subdivisions. The bath liquid is vigorously stirred by an efficient propeller which is driven by a quiet induction motor.

WF-360

CONSTRUCTION AND DIMENSIONS

The bath is of stainless steel; the outer case is sheet steel finished in grey stoved enamel. Between them is packed glass fibre insulation. All the controls are mounted in a stainless steel case which bridges one end of the bath. A false bottom ensures efficient water circulation with all bath loads. The immersion heater is metal sheathed.

Dimensions

	H	W	D	
Working space	14	38	21	cm
	5½	15	8	in
Overall	28	50	24	cm
	11	19½	9½	in
Power rating, maximum	1500W			

WF-360

WATER BATH, *Gallenkamp*, **10 litre capacity, stainless steel,** as specification, *Compenstat* controlled for 100°C max. With induction motor-stirrer. For single phase a.c. supplies only. **Without accessories.**

For 220/240V	Each **£37. 10. 0.**	*b*
For 200/210V	Each **£37. 10. 0.**	*bN*
For 110/120V	Each **£37. 10. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

WF-363	**Stirrer motor**	Each £2. 7. 0.	c
WF-365	**Heating element, 1500W** ...	Each £3. 0. 0.	b

When ordering replacement parts please state serial number of water bath and supply voltage.

ACCESSORIES FOR WATER BATH WF-360

WF-371	**Cooling coil,** for clipping to the side of the bath, with connections for 8–9 mm bore flexible tubing.	Each £5. 18. 0.	*b*
WF-373	**Cover, stainless steel, gabled,** to drain condensation to the sides of the bath	Each £4. 12. 0.	*b*
WF-374	**Thermometer holder,** for clipping over side of bath.	Each £0. 12. 6.	*b*
WF-376	**Pump,** for circulating water to external apparatus. Maximum head 60 cm at zero flow, maximum output 4 litres/min at zero head. With outlet nozzles suitable for 10–12 mm bore flexible tubing.	Each £1. 5. 0.	*b*

For larger capacity circulating pump see Water Pumps.

•**WF-380**	**Spheres, polypropylene,** 20 mm diameter. For use in water baths as a floating lid to minimise evaporation and heat losses. 200 spheres cover approximately 600 cm² and weigh approximately 150 g. In packs of 200.	Pack £1. 0. 0.	*m*

NOTE: 2 packs required to cover WF-360 with a single layer.

STAINLESS STEEL RACKS FOR WATER BATHS WF-360, WF-400 and WF-455.

WF-386	**Rack,** serological tests, to hold thirty six 75×12 mm tubes, with holes numbered 1 to 36.	Each £3. 2. 0.	*b*
WF-388	**Rack,** for serological tests, adjustable in height to hold thirty-six tubes from 38 mm to 90 mm long and up to 12 mm diameter, with holes numbered 1 to 36.	Each £5. 8. 0.	*b*
WF-390	**Rack,** for methylene blue and resazurin tests, to hold ten tubes 150×16 mm, with holes numbered 1 to 10.	Each £2. 13. 0.	*b*
WF-392	**Rack,** general purpose, to hold twenty-four tubes 150×16 mm	Each £3. 14. 0.	*b*
WF-394	**Rack,** general purpose, to hold sixteen tubes 150×25 mm	Each £3. 12. 0.	*b*

NOTE: Racks WF-386, 388 or 390 ordered in sets can be lettered A, B, C, etc., to special order.

Table showing number of racks accommodated by *Gallenkamp* Water Baths.

Rack	Bath List No.			
	WF-360	**WF-400**	**WF-455**	**WF-470†**
WF-386	3	4	7	12
WF-388	3	4	7	12
WF-390	6	10	15	28
WF-392	1	2	3	6
WF-394	1	2	3	6

†For details of 65 litre water bath WF-470 please refer to **Addenda.**

Items on this page normally available from stock except those coded *N*.

Gallenkamp GENERAL

For laboratory applications in which constant temperature and rapid heat transference to samples is required. Applications include long term static incubations, sample conditioning, water absorption and solubility tests, chemical kinetics investigation etc.

PERFORMANCE AND CONTROLS

Temperature range	Ambient +5°C to 100°C
Temperature fluctuation	0·3°C max. (with water)
Temperature variation	0·2°C over whole working volume

NOTES: 1. For use above 50°C with water, the gabled cover should be fitted to minimise evaporation.

2. For use at or below ambient temperatures, the cooling coil and a supply of cold water are necessary.

The controls are grouped in a compartment at one end of the bath and include the mains ON/OFF switch, load indicator lamp and the *Compenstat* direct reading thermostat, scaled 0–100°C in 5°C subdivisions.

General Purpose WATER BATH 15 litre capacity

WF-400 with IH-360

WF-400

WATER BATH, *Gallenkamp*, **15 litre capacity, stainless steel,** as specification, *Compenstat* controlled, for 100°C max. For single phase a.c. supplies only.

Without accessories

For 220/240V	Each	**£50. 0. 0.**	*b*
For 200/210V	Each	**£50. 0. 0.**	*bN*
For 110/120V	Each	**£50. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

NOTE: This water bath can be converted to a metabolic shaking incubator IH-350 after purchase. Quotation for set of additional parts and fitting instructions on request.

REPLACEMENT PART

WF-402	**Heater, 500W**	Each	**£3. 4. 0.**	*b*

When ordering replacement part please state serial number of water bath and supply voltage.

ACCESSORIES

IH-360	**Cover,** stainless steel, gabled to drain condensation to sides of bath. For price see entry in List No. sequence.			
WF-404	**Cooling coil,** to clip over side of bath. With connections for 8–9 mm bore flexible tubing. ...	Each	**£8. 0. 0.**	*b*
WF-406	**Thermometer holder,** stainless steel, clipping on side of bath	Each	**£0. 12. 0.**	*b*
WF-408	**Shelf, adjustable**	Each	**£6. 5. 0.**	*b*
TJ-440	**Thermometer,** scale span 0 to 110°C	For prices see entries in List No. sequence.		
WF-380	**Spheres,** polypropylene, to minimise evaporation and heat losses. 2 packs required			

RACKS FOR WATER BATH WF-400

WF-386	**Rack,** for serological tests to hold thirty-six 75 × 12 mm tubes, with holes numbered 1 to 36	For numbers of racks which can be accommodated and prices see entries in List No. sequence.
WF-388	**Rack,** for serological tests, adjustable in height to hold thirty-six tubes from 38 mm to 90 mm long and up to 12 mm dia. with holes numbered 1 to 36...	
WF-390	**Rack,** for methylene blue and resazurin tests, to hold ten tubes 150 × 16 mm, with holes numbered 1 to 10	
WF-392	**Rack,** general purpose, to hold twenty-four tubes 150 × 16 mm...	
WF-394	**Rack,** general purpose, to hold sixteen tubes 150 × 25 mm...	

WATER BATHS WITH SHAKER PLATFORMS

Water baths with shaker platforms for the continuous agitation of bottles, flasks or tubes are listed under **INCUBATORS**. The complete range of *Gallenkamp* incubators also includes gravity and mechanically convected air models for operation above or below ambient temperature. For details see pages 428 to 435.

Items on this page normally available from stock except those coded *N*.

PURPOSE WATER BATHS

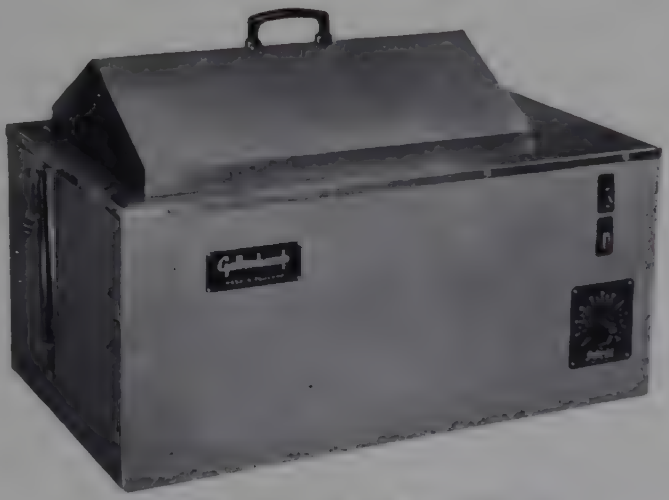
- **Accurate temperature control by** ***Compenstat***
- **Stainless steel interiors**
- **Optional accessories including covers, shelves, cooling coils and tube racks**

CONSTRUCTION AND DIMENSIONS

The interspace between the stainless steel interior and the grey stoved enamel finished outer case is filled with high efficiency fibre glass insulation. The heaters, which are metal sheathed, are mounted outside the working space just under the floor of WF-400 and inside the working space just above the floor of WF-455.

	WF-400	**WF-455**
	H W D	H W D
Overall dimensions	22 × 50 × 35 8½ × 19½ × 14	27 × 62 × 41 cm 10½ × 24½ × 16 in
Internal dimensions	16 × 35 × 30 6½ × 14 × 12	20 × 48 × 33 cm 8 × 19 × 13 in
Heater rating	500W	1500W

General Purpose **WATER BATH** 30 litre capacity



WF-455 with WF-458 and WF-460

WF-455

WATER BATH, *Gallenkamp*, **30 litre capacity, stainless steel,** as specification. *Compenstat* controlled, for 100°C max. For single phase a.c. supplies only. Supplied with perforated shelf, the height of which can be adjusted in 2·5 cm steps. **Without cover or other accessories.**

For 220/240V	Each **£68. 0. 0.**	*b*
For 200/210V	Each **£68. 0. 0.**	*bN*
For 110/120V	Each **£71. 10. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PART

WF-456	**Heater,** 1500W	Each £3. 10. 0.	*b*

When ordering replacement parts please state serial number of water bath and supply voltage.

For 70 litre bath of similar design see WF-470 in **Addenda.**

ACCESSORIES

WF-458	**Cover,** stainless steel, gabled to drain condensation to sides of bath, with handle and tubulure for insertion of thermometer...	Each **£9. 5. 0.**	*b*
WF-459	**Cooling coil,** fixing to side of bath. With connections for 8–9 mm bore flexible tubing ...	Each **£8. 0. 0.**	*b*
WF-460	**Constant level device**	Each **£3. 16. 0.**	*b*
TJ-440	**Thermometer,** scale span 0 to 110°C	For prices see entries in List No. sequence.	
WF-380	**Spheres,** polypropylene, to minimise evaporation and heat losses. 3 packs required		
WF-406	**Thermometer holder,** stainless steel, to clip over side of bath ...		

RACKS FOR WATER BATH WF-455

WF-386	**Rack,** for serological tests, to hold thirty-six 75 × 12 mm tubes, with holes numbered 1 to 36	For numbers of racks which can be accommodated and prices see entries in List No. sequence.
WF-388	**Rack,** for serological tests, adjustable in height to hold thirty-six tubes from 38 mm to 90 mm long and up to 12 mm dia. with holes numbered 1 to 36.	
WF-390	**Rack,** for methylene blue and resazurin tests, to hold ten tubes 150 × 16 mm with holes numbered 1 to 10	
WF-392	**Rack,** general purpose, to hold twenty-four tubes 150 × 16 mm...	
WF-394	**Rack,** general purpose, to hold sixteen tubes 150 × 25 mm...	

Items on this page normally available from stock except those coded *N.*

Gallenkamp REFRIGERATED THERMOSTATIC BATH

35 LITRE CAPACITY

with transistorised temperature control

For reliable long term operation at any temperature between −20°C and 50°C. Particularly suitable for maturing jelly samples at 10°C to BS 647 and BS 757.

Gallenkamp

WF-720

PERFORMANCE AND OPERATION

Temperature range (in ambient of 25°C)	−20°C to 50°C (see Note below).
Temperature fluctuation	±0·05°C

NOTE: Under favourable ambient conditions the bath can be operated down to −30°C.

Temperature is controlled by a contact thermometer which actuates a transistorised power switch in the heater supply circuit. Below ambient temperature, the refrigerator is operated continuously. The bath liquid (which can be water, aqueous ethylene glycol or light oil, depending on operating temperature) is vigorously and noiselessly stirred by an induction motor driven high efficiency propeller.

CONSTRUCTION

The bath is enclosed by a steel outer case and the 8 cm interspace is filled with rigid polyurethane foam insulation. The whole assembly is vapour sealed and the plinth beneath it contains the refrigerator. Across one end of the bath is a bridge unit which houses the electrical controls and supports the heater, evaporator-cooling coil, stirrer and contact thermometer. A hinged, easy-lift cover is fitted for use when the bath is operated below about 20°C. The height of the shelf within the bath may be adjusted on a simple ladder frame. The exterior is finished in grey stoved enamel and the whole bath is mounted on smoothly running castors.

- **Large capacity interior of stainless steel**
- **Adjustable shelf**
- **Quiet in operation**
- **Efficient insulation**
- **Alternative version with external circulating pump**

DIMENSIONS

	H W D
External, excluding contact thermometer	86 × 69 × 56 cm 34 × 27 × 22 in
Internal working space	23 × 43 × 41 cm 9 × 17 × 16 in
Net weight, approx.	65 kg (140 lb)
Power rating	850W

WF-720

COOLED THERMOSTATIC BATH, *Gallenkamp,* **35 litre capacity,** as specification, with refrigerator, transistorised temperature control, contact thermometer, stirrer and motor, adjustable shelf, hinged cover and castors. For single phase a.c. supplies only.

For 220/240V	Each	**£220**. 0. 0.	*b*
For 200/210V	Each	**£221**. 0. 0.	*bN*
For 110/120V	Each	**£221**. 0. 0.	*bN*

When ordering please state voltage and nature of supply.

WF-721

COOLED THERMOSTATIC BATH, *Gallenkamp,* **35 litre capacity,** as WF-720 but **with built-in pump** to circulate bath fluid to external apparatus at rates between 11·5 l/min at zero head and 2 l/min at 160 cm head. For single phase a.c. supplies only.

For 220/240V	Each	**£254**. 0. 0.	*b*
For 200/210V	Each	**£255**. 0. 0.	*bN*
For 110/120V	Each	**£255**. 0. 0.	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

WF-724	**Heating element**	Each	**£3**. 0. 0.	*b*
WF-725	**Stirrer motor**	Each	**£3**. 14. 0.	*b*
WF-726	**Contact thermometer,** range −38°C to +50°C.	Each	**£6**. 0. 0.	*c*

When ordering replacement parts please state serial number of bath and supply voltage.

ACCESSORY

LX-110 Lubricant, for stirrer motor. For price see entry in List No. sequence.

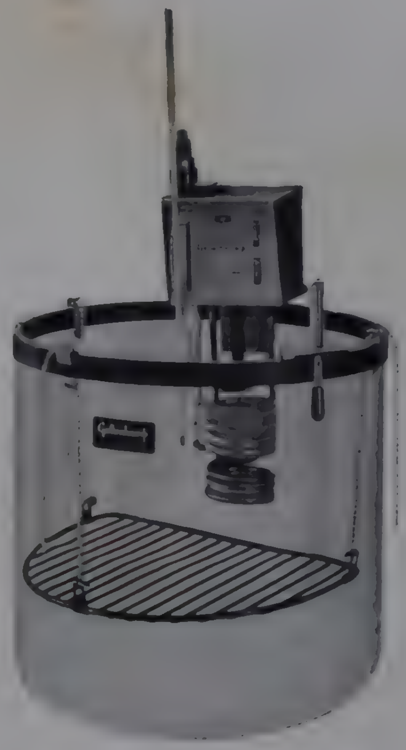
Items on this page normally available from stock except those coded *N*.

Gallenkamp THERMOSTATIC WATER BATH

20 LITRE CAPACITY

For general purposes where precise temperatures must be maintained over long periods of time. Also suitable for many standard test methods including IP 49, IP 59, IP 60, IP 160, IP 189 and IP 190,

- **Good visibility—all glass tank**
- **Control by Thermo Stirrer with contact thermometer and solid state switching**
- **Vigorous agitation without vortexing**
- **Accessories include adjustable shelf, laboratory scaffold rod fixings, equipment for viscometry and an inexpensive circulating pump**



WF-850 with accessories

PERFORMANCE AND DESCRIPTION

Temperature range	ambient to 90°C
Temperature fluctuation	±0·05°C
Temperature variation	0·1°C

This water bath is an assembly comprising:

WF-855
Borosilicate glass tank with rubber rim.

TM-860
Thermo Stirrer with 0–100°C contact thermometer and solid state switching, 3-power heater and motor driven stirrer.

DIMENSIONS

Tank, internal	34 cm dia. × 30 cm high
Tank with Thermo Stirrer and contact thermometer fitted, overall	H W D 50 × 42 × 43 cm

- **WF-850**

WATER BATH, 20 litre capacity, *Gallenkamp*, as specification comprising WF-855 glass tank and TM-860 Thermo Stirrer with contact thermometer 0–100°C, 3-power heater and motor driven stirrer. For single phase supplies.

For 220/240V 50 Hz	Each **£44. 0. 0.**	*b*
For 200/210V 50 Hz	Each **£44. 0. 0.**	*bN*
For 110/120V 60 Hz	Each **£44. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

WF-855	Tank, borosilicate glass with rubber rim.	Each **£8. 10. 0.**	*m*
TM-864	Heating element, 1000W	For details and prices see entries in List No. sequence.	
TM-866	Contact thermometer, range 0 to 100°C		
WF-363	Stirrer motor		

When ordering replacement parts please state serial number of Thermo Stirrer and supply voltage.

ACCESSORIES

WF-860	Wire shelf, plastics coated, adjustable, including three ball chains and fittings ...	Each **£5. 12. 0.**	*b*
WF-864	Support rod, 5 cm × 12·7 mm dia, with clamp to fit rim of bath	Each **£1. 5. 0.**	*b*
WF-866	Support plate, with three 2 in diameter holes to accommodate viscometer holders VS-630 to VS-634. **Requires two support rods WF-864 for mounting.**	Each **£5. 8. 0.**	*b*
TM-844	Retort rod mount ...	For details and prices see entries in List No. sequence.	
TM-870	Cooling coil...		
TM-872	Holder, for mercury in glass thermometer		
TM-874	Heater, 1500W		

When ordering please state serial number of Thermo Stirrer and supply voltage.

WF-376	Pump, for circulating water to external apparatus ...	For details and prices see entries in List No. sequence.
WF-380	Spheres, polypropylene, to minimise evaporation and heat losses. 2 packs required.	
TJ-102	Thermometer, to BS 1704, GP 105C/0·5/100, suitable for measuring the water bath temperature	
VS-630	Viscometer holder ...	
VS-632	Viscometer holder ...	
VS-633	Viscometer holder ...	
VS-634	Viscometer holder ...	

Items on this page normally available from stock except those coded *N*.

(AG) WATER DETERMINATION APPARATUS

TO IP 74 and BS 756

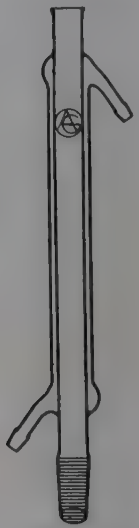
For determination of water content by Dean and Stark method

WJ-130

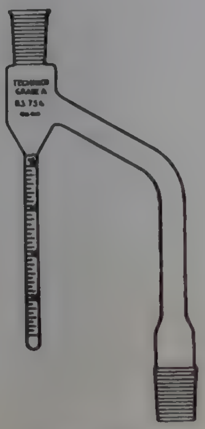
CONDENSER, (AG), borosilicate glass, to BS 756 Fig. 3 and IP 74, jacket length 400 mm, with 19/26 cone.
Dozen **£13. 0. 0.** Each **£1. 3. 6.** *a*

WJ-135

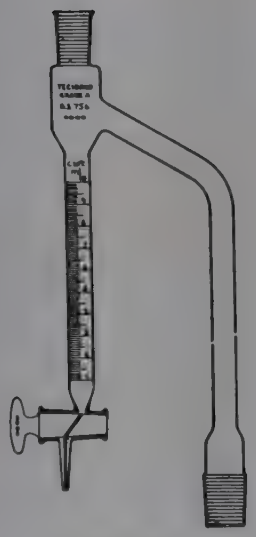
SPRAY TUBE, (AG), to BS 756 Fig. 4.
Dozen **£3. 6. 0.** Each **£0. 6. 8.** *a*



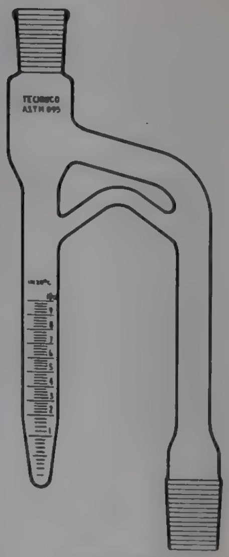
WJ-130



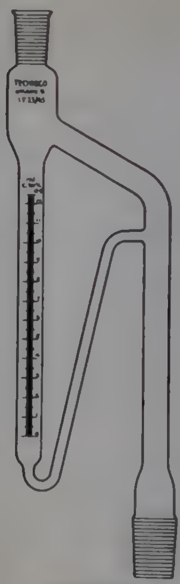
WJ-150



WJ-170



WJ-175



WJ-230

BOROSILICATE GLASS RECEIVERS

WJ-150

RECEIVER, (AG), Type I, to BS 756 Fig. 5, capacity 2 cm^3 subdivided in 0·05 cm^3. With 24/29 cone and 19/26 socket ... Dozen **£20. 10. 0.** Each **£1. 17. 0.** *a*

WJ-160

RECEIVER, (AG), Type I, to BS 756 Fig. 6, capacity 7·5 cm^3 subdivided in 0·1 cm^3. With 24/29 cone and 19/26 socket ... Dozen **£21. 10. 0.** Each **£1. 19. 0.** *a*

WJ-170

RECEIVER, (AG), Type I, to BS 756 Fig. 7, capacity 10 cm^3 subdivided in 0·1 cm^3. With oblique bore stopcock, 24/29 cone and 19/26 socket.
Dozen **£28. 10. 0.** Each **£2. 12. 0.** *a*

WJ-175

RECEIVER, (AG), to ASTM D95, capacity 10 cm^3 subdivided in 0·1 cm^3 to 1 cm^3 and 0·2 cm^3 from 1 to 10 cm^3. With 24/29 cone and 19/26 socket.
Dozen **£30. 0. 0.** Each **£2. 14. 0.** *a*

WJ-180

RECEIVER, (AG), Type I, to BS 756 Fig. 8, capacity 25 cm^3 subdivided in 0·2 cm^3. With 24/29 cone and 19/26 socket ... ... Dozen **£28. 10. 0.** Each **£2. 12. 0.** *a*

WJ-230

RECEIVER, (AG), Type 2, to BS 756 Fig. 12, capacity 12·5 cm^3 subdivided in 0·1 cm^3. With 24/29 cone and 19/26 socket ... Dozen **£27. 0. 0.** Each **£2. 9. 0.** *a*

Round bottom flask, 500 ml, with 24/29 socket see Q-FR 500/3S under QUICKFIT APPARATUS

OTHER APPARATUS FOR THE DETERMINATION OF WATER CONTENT

will be found in different parts of the catalogue according to application as shown below.

APPLICATION: MOISTURE IN	APPARATUS	REFERENCE
Air	Hygrometers	HYGROMETERS
Non-aqueous solutions	Karl Fischer electrometric apparatus	ELECTROCHEMICAL ANALYSIS (EJ-960, EJ-980)
Coal and coke	*Gallenkamp* minimum free space oven	MOISTURE (MV-470)
Flour, cereals, tobacco, paper etc.	Infrared balances	MOISTURE (MV-660)
General liquids and solids	*Gallenkamp* vacuum oven	MOISTURE (MV-600)
Soil	*Gallenkamp* soil tensiometer	SOIL EXAMINATION (SH-080 to SH-090)

All items on this page normally available from stock.

WATER HEATERS

WK-620

WATER HEATER, gas, *Ascot*, **continuous flow, single point.** Fitted hot and cold taps and incorporating gas and water governors.

Temperature selector provides for outputs of approximately 3 litres/min at 50°C or 2 litres/min at 65°C. White vitreous enamel finished with chromium plated bottom cover and 23 cm swivel outlet. Dimensions 59 × 23 × 20 cm deep ... ... Each **£24. 2. 9.** *m*

WK-620

WK-640

WATER HEATER, gas, *Ascot*, **continuous flow, multi-point,** intended to serve several hot water taps. Fitted with gas and water governors, gas control and draught diverter.

Temperature selector provides for outputs of approximately 17 litres/min at 30°C, 10 litres/min at 50°C or 7 litres/min at 65°C. White vitreous enamel finished. Dimensions 102 × 38 × 23 cm deep... Each **£43. 2. 4.** *m*

WK-670

WK-670

WATER HEATER, electric, *GEC*, **storage pattern,** Suitable for under bench fitting and intended to serve one or more taps. The 3 kW heater and thermostat provide for rapid heating of water to temperature adjustable between 40 and 80°C. The 9 litres capacity storage tank is of tinned copper, fibreglass lagged and enclosed in white stove enamelled steel case. Dimensions 25 × 51 × 25 cm deep. For 200/250V a.c. supplies.... Each **£14. 18. 10.** *f*

WK-720

WATER HEATER, electric, *GEC*, **storage pattern, single point.** Fitted with control valve and 23 cm swivel outlet. Otherwise similar to WK-670. Dimensions 43 × 28 × 21 cm deep. For 200/250V a.c. supplies.
Each **£14. 18. 10.** *f*

WF-760

WATER HEATER, electric, *Sadia*, **storage pattern, single point.** Fitted with control valve and 30 cm swivel outlet. With 1 kW heater, thermostat and lagged 22 litres capacity tinned copper tank. Intended to supply water at 70°C. In white stove enamelled case. Dimensions 66 × 33 cm dia. For 200/250V a.c.... Each **£30. 7. 6.** *f*

When ordering electric water heaters please state voltage and nature of supply.

WK-720

WK-760

All items on this page normally available from stock.

WATER PUMPS

BENCH MOUNTING

WM-050

WM-050

PUMP, water, centrifugal, driven by a series wound motor. Suitable for pumping water at temperatures between 0 and 90°C. With nylon filled bakelite pump body, impeller and tubulures, neoprene seal and stainless steel driving shaft.

Flow at zero head	22 litres/min
Flow at 200 cm head	18 litres/min
Maximum head	600 cm
Tubulures	inlet and outlet 12·5 mm o.d.
Motor rating	up to 4 hours continuous running
Overall dimensions	21 × 9 × 12 cm high

For 220/240V 50/60 Hz single phase supplies.

Complete with terminal box and length of 3-core cable. Pump must be primed before use... Each **£11. 10. 0.** *m*

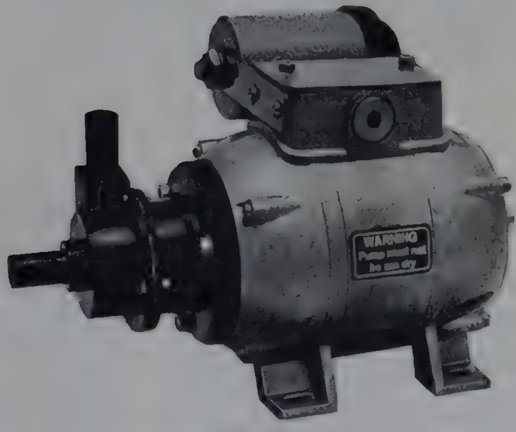
WM-054

WM-054

PUMP, water, centrifugal, construction and performance as WM-050 but fitted with an adjustable rheostat to control flow rate and mounted in a splashproof steel carrying case. Overall dimensions 30 × 14 × 17 cm high.

For 220/240V 50/60 Hz single phase supplies.

Complete with terminal box and length of 3-core cable. Pump must be primed before use... Each **£24. 5. 0.** *m*


WM-080

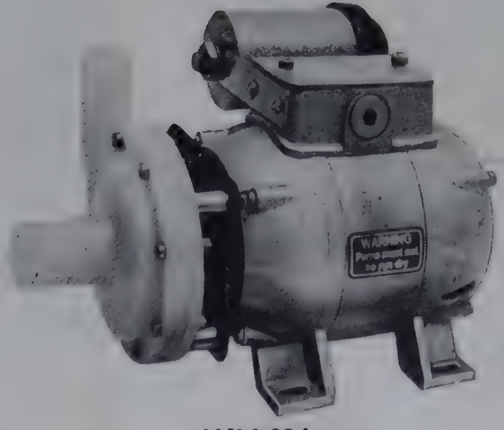
WM-080

PUMP, water, centrifugal, driven by a constant speed permanent capacitor motor. Suitable for pumping water at temperatures between 0 and 90°C. With nylon filled bakelite pump body, impeller and tubulures, neoprene seal and stainless steel driving shaft.

Flow at zero head	11 litres/min
Flow at 150 cm head	2 litres/min
Maximum head	170 cm
Tubulures	inlet and outlet 12·5 mm o.d.
Motor rating	up to 4 hours continuous running
Overall dimensions	21 × 11 × 12 cm high

For 220/240V 50 Hz single phase supplies.

Complete with fitted capacitor, terminal box and length of 3-core cable. Pump must be primed before use.
Each **£13. 0. 0.** *m*


WM-084

WM-084

PUMP, water, centrifugal, similar to WM-080 but with polypropylene body, impeller and tubulures and acrylonitrile seal.

Flow at zero head	23 litres/min
Flow at 200 cm head	15 litres/min
Maximum head	500 cm
Tubulures	inlet 25 mm o.d. outlet 19 mm o.d.
Motor rating	continuous
Overall dimensions	21 × 11 × 12 cm high

For 220/240V 50 Hz single phase supplies.

Complete with fitted capacitor, terminal box and length of 3-core cable. Pump must be primed before use.
Each **£17. 0. 0.** *m*

All items on this page normally available from stock.

WATER AND CHEMICAL PUMPS

BENCH MOUNTING

WM-150

PUMP, water and chemical, *Quickfit*, **centrifugal,** with capacitor start induction motor for intermittent operation, borosilicate glass pump body and glass/PTFE seal which revolves against an alumina disk. Suitable for acids, except hydrofluoric and hot conc. phosphoric, dilute alkalis, and organic solvents at temperatures between −40 and 100°C. Inlet tubulure 23 mm o.d., outlet tubulure 20 mm o.d. In corrosion resistant case with mains switch, indicator lamp and handle. Pump requires priming before use.

Ref. No.	P13/5	P12	P11	
Water flow,				
zero head	32	27	27 l/min	
200 cm head	23	12	12 l/min	
Maximum head	450	300	300 cm water	
Electrical supply	100/110V 60 Hz	200/220V 50 Hz	230/250V 50 Hz	
Each	£77. 0. 0.	£77. 0. 0.	£77. 0. 0.	*fN*

When ordering please state Ref. No.

WM-150

IMMERSION

WM-165

PUMP, water and chemical, centrifugal immersion, driven by a series wound motor. Immersed parts fabricated from stainless steel and PTFE. Suitable for pumping a wide range of corrosive materials and solvents, at temperatures between 20 and 120°C. Can be dismantled for cleaning.

Water flow, zero head	22 litres/min
Water flow, 200 cm head	15 litres/min
Maximum head	500 cm water
Immersion depth	24 cm
Pump head diameter	10·5 cm
Outlet diameter	2 cm
Motor rating	up to 4 hours continuous running

For 220/240V 50 Hz single phase supplies. With 3-core cable and 12·5 mm dia. rod for bosshead mounting.
Each **£26. 10. 0.** *m*

WM-170

PUMP, water and chemical, centrifugal immersion, construction, pump head and outlet diameters as WM-165 but driven by an induction motor.

Water flow, zero head	25 litres/min
Water flow, 200 cm head	10 litres/min
Maximum head	300 cm water
Immersion depth	28 cm
Motor rating	continuous

For 200/250V 50 Hz single phase supplies. With 3-core cable and 12·5 mm dia. rod for bosshead mounting.
Each **£32. 10. 0.** *m*

WM-175

PUMP, water and chemical, centrifugal immersion, construction and performance similar to WM-170 but designed to pump liquified gases at temperatures down to −150°C. A heat break in the shaft minimises heat transfer between pump and motor. For 200/250V 50 Hz single phase supplies. With 3-core cable and 12·5 mm dia. rod for bosshead mounting.
Each **£58. 10. 0.** *m*

WM-165

WM-175

Items on this page normally available from stock except those coded *N*.

PERISTALTIC WATER AND CHEMICAL PUMPS

GENERAL PURPOSE

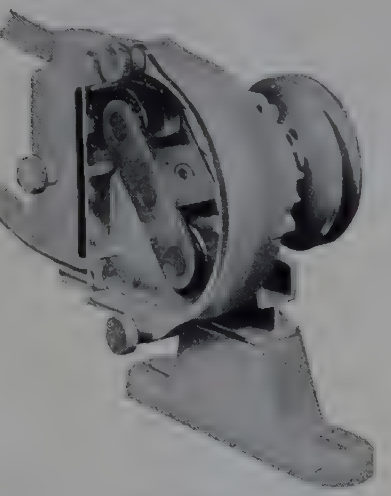
***WM-200**

PUMP, water and chemical, peristaltic two roller self priming pattern. For use with flexible tubings, maximum o.d. 13 mm, wall thickness at least 1·5 mm. Maximum speed of rotation 500 rev/min. A water flow rate of 4 l/min at 300 cm head can be achieved using tubing TX-800 N8 and rotational speed of 350 rev/min. With detachable foot for bench mounting, 12 mm dia. rod for bosshead mounting, and two pulleys 6 cm and 15 cm dia. for fitting to pump spindle. Without motor drive, motor pulley, V-belt or flexible tubing.

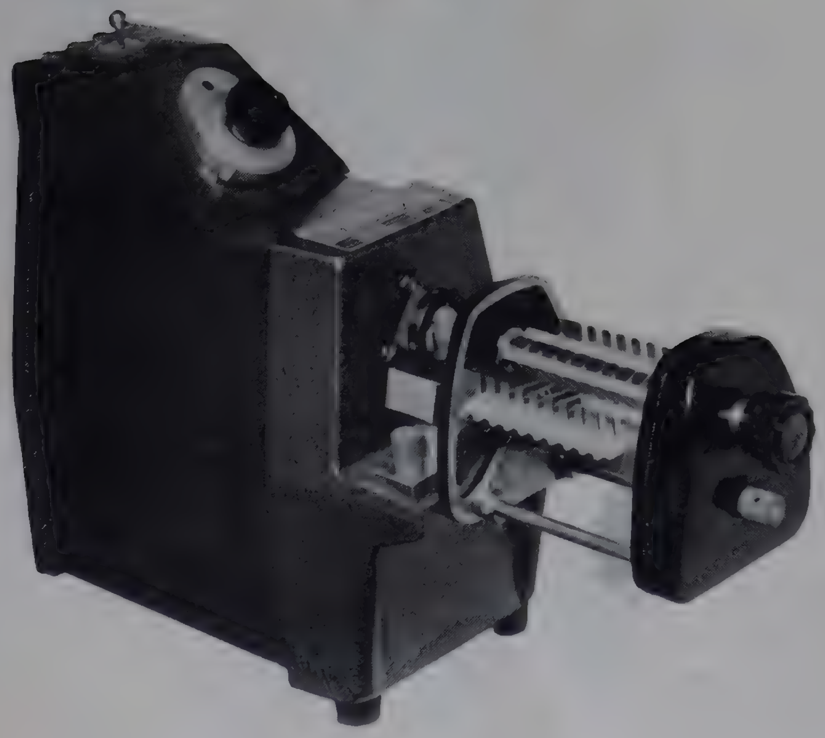
Each **£10.14. 0.** *mS*

ACCESSORIES

***WM-202**	**V-belt,** 60 cm circumference ...	Each **£0. 7. 0.**	*cS*
SS-540	**Multispeed motor,** 10-step ...	For details and prices see entries in List No. sequence.	
MX-720	**Pulley,** size 1 to fit SS-540 shaft ...		
TX-520	**Tubing,** rubber, N8		
TX-800	**Tubing,** silicone rubber, N8 ...		



WM-200



WM-260 with WM-290

PRECISE METERING

For pumping, dosing and metering a wide range of fluids including sterile and corrosive ones. The standard pumps WM-250 and WM-260 use an elastic tube clipped to a curved track which is mounted concentrically with a rotor having three rollers. Rotation of the rollers flattens the tube against the track and these flats move the contents along the tube by positive displacement. As the tube recovers, the suction created draws more fluid into the tube.

The multichannel accessories WM-290 and WM-295 have △ section rotors round which the tube elements are wrapped so as to kink at 3 points of small radius. The rotor action within the loop of tubing moves the kinks along to provide positive displacement of the contents.

WM-250

PUMP, water and chemical, peristaltic metering. A single channel pump accepting flexible tubing from 0·5 to 8·0 mm bore of wall thickness 1·6 mm and with a maximum speed of approx. 220 rev/min. A solid state electronic speed control provides infinitely variable adjustment down to approx. 1/100 of maximum. Metering accuracy of approx. 0·5% is maintained down to about 1/50 of maximum speed and the quoted minimum flow rates are based on this figure. Direction of rotation is reversible and a polarised socket is provided for remote control.

Tube bore	0·5	0·8	1·6	3·2	4·8	8 mm
Flow, max.	8	15	50	200	380	650 ml/min
min.	0·15	0·3	1·0	4·0	7·5	13 ml/min

This pump is **not** suitable for use with multichannel accessories. For 200/250V 50 Hz single phase supplies. **Requires but does not include flexible tubing of 1·6 mm wall. WM-275 is recommended.**

Each **£92. 0. 0.** *f*

WM-260

PUMP, water and chemical, peristaltic metering. As WM-250 but with maximum speed approx. 7 rev/min providing a range of flow rates as follows.

Tube bore	0·5	0·8	1·6	3·2	4·8	8 mm
Flow, max.	0·25	0·5	1·5	6	12	20 ml/min
min.	0·005	0·01	0·03	0·12	0·25	0·3 ml/min

This pump can be converted for multichannel operation by addition of conversion accessories listed below, up to a limit of 50 channels. For 200/250V 50 Hz single phase supplies. **Requires but does not include flexible tubing of 1·6 mm wall. WM-275 is recommended.**

Each **£107. 0. 0.** *f*

ACCESSORIES

WM-275 **Tubing, silicone rubber,** 1·6 mm wall suitable for above single channel pumps.

Bore	0·5	0·8	1·6	3·2	4·8	8 mm	
Yard	**3/–**	**6/–**	**9/–**	**10/6**	**10/6**	**22/6**	*f*

WM-290 **Multichannel delta conversion kit,** for use with pump WM-260. Comprising drive adapter, one 10 channel delta module WM-295, end plate with priming knob and one set of 10 tube elements 1, 2 or 4 mm bore. Unless otherwise specified when ordering, 1 mm will be supplied.

Tube bore	1	2	4 mm
Flow, max.	0·2	0·6	2·5 ml/min
min.	0·004	0·012	0·05 ml/min

Each **£38. 0. 0.** *f*

WM-295 **Delta modules, 10 channel,** additional for use with above. These modules can be connected one to another on WM-290 before fitting the end plate. By this means pump WM-260 can be operated up to a limit of 5 modules i.e. 50 channels. Each module is supplied complete with one set of 10 tube elements, 1, 2 or 4 mm bore, as specified when ordering ... ... Each **£20. 0. 0.** *f*

Items on this page coded *S* normally available from stock.

DISSOLVED OXYGEN METER

Developed in co-operation with the Freshwater Biological Research Association, this is a simple robust meter for the direct determination of dissolved oxygen in river water, reservoirs, effluents etc. By means of a Mackereth lead-silver oxygen electrode within a polythene membrane, the instrument gives direct readings in percentage oxygen, relative to the value of a saturated solution of air in the water. The readings are temperature compensated by a resistance thermometer which is also used for measurement of temperature.
The instrument is completely portable being powered by five *Mallory* batteries which provide for 100 days continuous operation. Battery check is built in. Recorder outlet sockets are fitted for continuous simultaneous recording of oxygen concentration and temperature on any 1mA recorders of up to 400 ohms resistance.

	Oxygen	Temperature
Ranges	0–100 and 0–200%	−5 to 30°C
Accuracy	5% at f.s.d.	±1·5°C
Discrimination	0·5%	0·2°C

Dimensions: 22 × 19 × 31 cm
Weight: 5·4 kg.

WP-720

DISSOLVED OXYGEN METER, *E.I.L.* **Model 15A,** as specification including probe containing electrode and resistance thermometer. With 5 batteries.
Each **£177. 2. 0.** *fN*

WP-720

REPLACEMENT PART

WP-722 **Batteries,** *Mallory* type RM42R. Set of 5 **£10.16. 3.** *fN*

WATER PURITY TESTER

A conductivity meter for determining the amounts of inorganic impurities dissolved in very pure water such as boiler feed water. For the control of water treatment, deionisation and distillation plant and measurement of water pollution.

A fully portable, direct reading instrument comprising a meter and a conductivity cell. The hand driven generator incorporated in the meter develops an a.c. output to render polarisation negligible. Readings are independent of the speed at which the handle is turned.

The dual cell with stainless steel electrodes has cell constants of 1·0 and 100. Temperature compensation is automatic. Five ranges are provided from 0–10 μmho/cm³ to 0–10⁵ μmho/cm³ at 20°C. Net weight 2 kg.

WP-740

WATER PURITY TESTER, *Dionic,* as specification, with carrying case ... ... Each **£73.10. 0.** *f*

WP-740

SEDIMENTATION

WP-820

SEDIMENTATION CONE, Imhoff, for determining amount of solid matter in sewage. Capacity 1000 cm³ with lower end graduated to 40 cm³. Each **£3. 8. 0.** *a*

ACCESSORY

WP-822 **Stand,** wooden, for two cones ... Each **£2.16. 0.** c

1000
ml
1000
ml

WP-820 and WP-822

Other apparatus for **Water and Sewage Testing:**

CS-200 et seq.	Colorimeter, *Gallenkamp.*
CX-300	Colony counter, *Gallenkamp.*
EJ-055 et seq.	Conductivity bridges.
FD-350 et seq.	Filter holders, *Gallenkamp.*
FH-500	Flame analyser, *Gallenkamp.*
IH-330 et seq.	Cooled incubators, *Gallenkamp.*
MP-766/785	Graticules.

Items on this page normally available from stock except those coded *N.*

Gallenkamp 'Alfloc' WATER TESTING MINILABS

WR-230

A comprehensive range of fully equipped Minilabs (originally designed by Imperial Chemical Industries Ltd.) for investigating the chemical characteristics of feed boiler and condensate water in land and marine installations. These tests are a necessary preliminary to the chemical processes involved in 'Alfloc' water treatment. The boiler feed and boiler water tests are based primarily on those published by the British Standards Institution in BS 1427 'Routine control methods of testing water used in industry' and BS 2690 'Methods of testing water used in industry.'

LAND MINILABS

Supplied in fitted hardwood working cabinets, without chemicals. For necessary 'Chempacs' see page 827.

WR-220

WATER TESTING MINILAB, 'Alfloc', **Model GA1,** for determination of hardness by Wanklyn soap solution, alkalinity and sulphite ... ... Each **£18. 10. 0.** *f*

WR-230

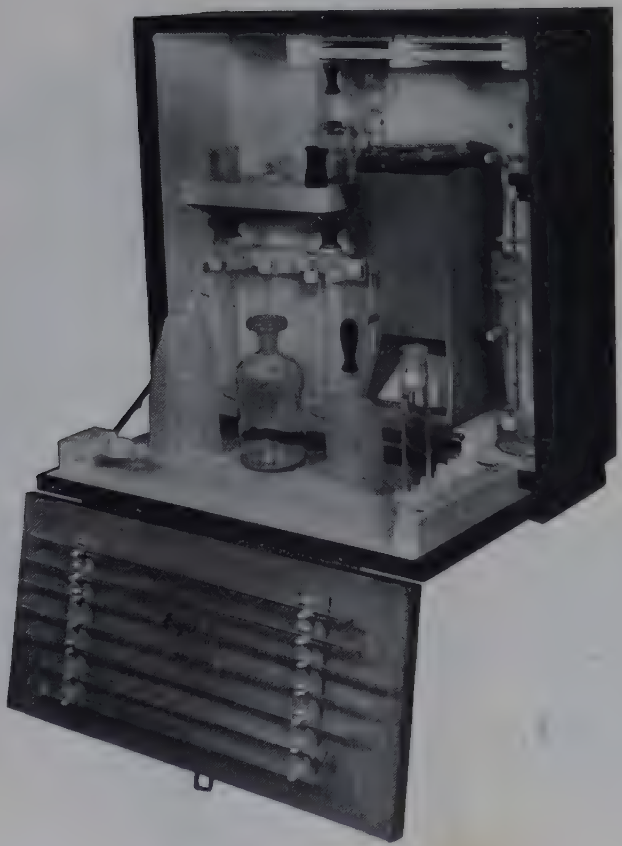
WATER TESTING MINILAB, 'Alfloc', **Model GA2,** for determination of hardness by Wanklyn soap solution, alkalinity, sulphite and phosphate ... Each **£21. 10. 0.** *f*

EXTENSIONS FOR 'Alfloc' GA1 and GA2 MINILABS

WR-245 **Chloride set,** comprising amber automatic burette with labelled reservoir bottle, 125 ml labelled dispensing bottle and 60 ml wide mouth labelled bottle. **Requires but does not include Chempac WR-515.** Each **£1. 7. 6.** *f*

WR-250 **Hydrometer set** for determination of dissolved solids. Comprising 'Alfloc' hydrometer 60°F, hydrometer jar, thermometer and bottle of detergent. Each **£10. 12. 6.** *f*

WR-252 **Hydrometer set,** as WR-250 but with 'Alfloc' hydrometer 85°F. ... ... Each **£10. 12. 6** *f*



WR-260

WR-260

WATER TESTING MINILAB, 'Alfloc', **Model O_2Z,** for determination of oxygen in feed water, range 0 to 0·12 ml O_2/litre, by the indigo carmine method, and hydrazine in boiler water by the colorimeter method. Each **£59. 10. 0.** *f*

All items on this page normally available from stock.

Gallenkamp 'Alfloc' WATER TESTING MINILABS

MARINE MINILABS

In fitted metal working cabinets finished in blue hammertone stoved enamel, suitable for wall or bench mounting. Without chemicals.

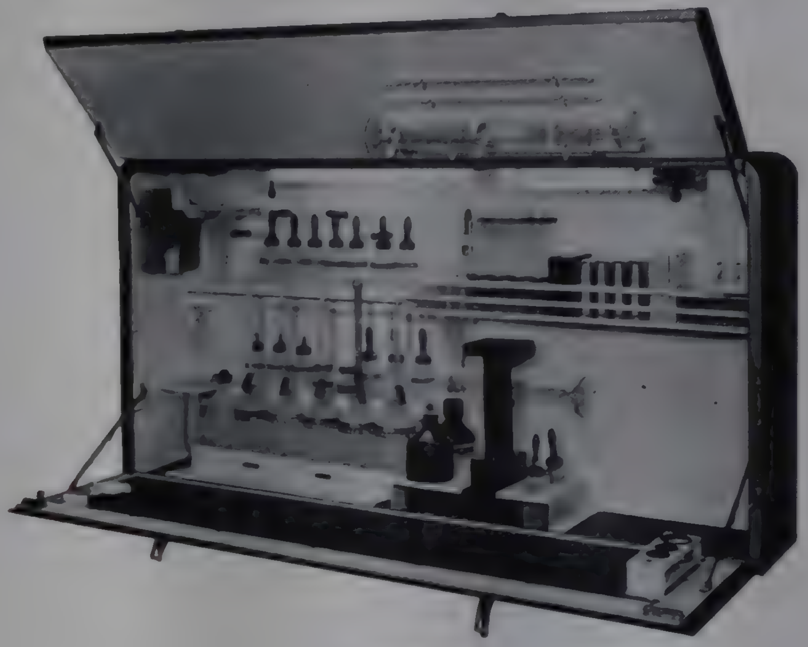
WR-400
WATER TESTING MINILAB, 'Alfloc', **Model M,** for determination of hardness by Wanklyn soap solution, alkalinity and chloride ... ... Each **£43. 10. 0.** *f*

WR-407
WATER TESTING MINILAB, 'Alfloc', **Model MS,** for determination of hardness by Wanklyn soap solution, alkalinity, chloride and sulphite ... Each **£46. 5. 0.** *f*

WR-415
WATER TESTING MINILAB, 'Alfloc', **Model MPS,** for determination of hardness by Wanklyn soap solution, alkalinity, chloride, sulphite and phosphate. Each **£59. 10. 0.** *f*

WR-480
WATER TESTING MINILAB, 'Alfloc', **Model W,** a complete testing laboratory with striplight illumination, for determination of total, calcium and magnesium hardness; phenolphthalein, methyl orange and caustic alkalinity; pH; chloride, sulphite and phosphate; oxygen and hydrazine. For 110/120, 200/210, 220/230 or 240/250V a.c. supplies ... ... Each **£216. 0. 0.** *f*

When ordering please state voltage and nature of supply.


WR-480

REPLACEMENTS FOR MARINE MINILABS

WR-500 Set of spares, comprising burettes and expendable components in a carton ... ... Each **£4. 12. 6.** c

CHEMICALS FOR 'ALFLOC' MINILABS

CHEMPACS

Each 'Alfloc' Minilab requires two or more 'Chempacs'. The Chempacs comprise sets of reagents for various tests as listed below and are packed in cases suitable for home and export delivery. Prices include cost of bottles and cases which are non-returnable.

WR-510	**Chempac basic reagent** ...	Each	**£4. 2. 0.**	*f*
WR-515	**Chempac chloride reagent...**	Each	**£2. 15. 6.**	*f*
WR-520	**Chempac E.D.T.A. reagent**	Each	**£5. 0. 0.**	*f*
WR-525	**Chempac oxygen zerox reagent.**	Each	**£3. 16. 0.**	*f*
WR-530	**Chempac phosphate reagent.**	Each	**£2. 15. 6.**	*f*
WR-535	**Chempac sulphite reagent...**	Each	**£2. 18. 6.**	*f*

SETS OF CHEMPACS for 'Alfloc' MINILABS

List No.	For 'Alfloc' Mini-lab	Quantity of Chempacs required for each Minilab						Each Set	
		WR-510	WR-515	WR-520	WR-525	WR-530	WR-535		
WR-550	GA1	1	–	–	–	–	1	**£7. 0. 6.**	*f*
WR-560	GA2	1	–	–	–	1	1	**£9. 16. 0.**	*f*
WR-570	O_2Z	–	–	–	2	–	–	**£7. 12. 0.**	*f*
WR-580	M	2	2	–	–	–	–	**£13. 15. 0.**	*f*
WR-582	MS	2	2	–	–	–	2	**£19. 12. 0.**	*f*
WR-584	MPS	2	2	–	–	2	1	**£22. 4. 6.**	*f*
WR-586	W	2	2	1	2	2	–	**£31. 18. 0.**	*f*

FILTERPAC

WR-590
FILTERPAC, 'Alfloc', containing 5 boxes of *Whatman* No. 1, 15 cm and one box of *Whatman* No. 6, 15 cm. Each **£1. 4. 0.** *d*

All items on this page normally available from stock.

COMPONENTS OF Gallenkamp 'Alfloc' MINILABS

List No.		Each
WR-600	**Bottle, dispensing,** polythene, 125 ml, labelled	
	'Alfloc' methyl orange	2/6 c
	'Alfloc' phenolphthalein	2/6 c
	'Alfloc' potassium chromate	2/6 c
	'Alfloc' wetting agent	2/6 c
WR-610	**Bottle, dropping,** polythene, 125 ml (rectangular shape)	5/6 c
WR-615	**Bottle, dropping,** polythene, 125 ml, labelled	
	'Alfloc' acid molybdate	6/– c
	'Alfloc' ammonia buffer	6/– c
	'Alfloc' carbonate/sulphite	6/– c
	'Alfloc' N/2 hydrochloric acid	6/– c
	'Alfloc' hydroquinone	6/– c
	'Alfloc' potassium hydroxide 26·87% w/w K_2O	6/– c
	'Alfloc' sulphate buffer	6/– c
	'Alfloc' 6·5% sulphuric acid	6/– c
	'Alfloc' thymol blue	6/– c
WR-616	**Bottle, dropping,** polythene, 125 ml, unlabelled	5/9 c
WR-670	**Bottle, reagent,** glass, 30 ml, with pipette	5/– c
WR-690	**Bottle, wide mouth,** polythene, 60 ml, labelled	
	'Alfloc' barium chloride—Poison	2/6 c
	'Alfloc' calcium hardness indicator	2/6 c
	'Alfloc' iodine indicator	2/6 c
	'Alfloc' sodium diethyl dithiocarbamate	2/6 c
	'Alfloc' sodium persulphate	2/6 c
	'Alfloc' total hardness indicator	2/6 c
WR-710	**Buds,** cotton, pkt.	2/6 c
WR-750	**Burette, automatic,** with labelled polythene reservoir	
	'Alfloc' N/25 barium chloride	25/– c
	'Alfloc' EDTA soln.	25/– c
	'Alfloc' potassium iodide/iodate	25/– c
	'Alfloc' N/50 silver nitrate	27/6 c
	'Alfloc' N/40 sodium thiosulphate	25/– c
	'Alfloc' N/50 sulphuric acid	25/– c
	'Alfloc' Wanklyn soap solution	25/– c
WR-751	**Burette,** amber, for WR-750 silver nitrate	20/– a
WR-800	**Comparator, Lovibond,** with 4 test tubes and disk 3/12	179/– f
WR-840	**Filter unit,** complete	22/6 c
WR-860	**Flask, conical,** 350 ml stoppered	5/6 c
WR-880	**Hydrometer,** 60°F, 'Alfloc'	118/– c
WR-885	**Hydrometer,** 85°F, 'Alfloc'	118/– c
WR-932	**Nessler disk,** NOH, hydrazine in H_2O	90/– f

List No.		Each
WR-948	**Pipette,** bulb, 10 cm^3	5/6 a
WR-950	**Pipette,** dropping, 2 cm^3	4/3 a
WR-951	**Pipette,** graduated, 5 cm^3	9/– a
WR-952	**Pipette,** graduated, 10 cm^3, fast	7/3 a
WR-960	**Specimen tube,** polythene, with 6 glass balls, 7-8 mm dia.	2/6 c
WR-980	**Stirring rod,** polythene, $6 \times \frac{3}{16}$ in.	3/6 c
WR-981	**Stirring rod,** glass, $6 \times \frac{1}{4}$ in.	2/6 c
WR-982	**Stirring rod,** glass, $12 \times \frac{3}{16}$ in.	2/6 c
WR-990	**Test tube,** polythene, $4\frac{1}{2} \times \frac{3}{4}$ in.	4/6 c

List No.		
BH-345	**Basin,** polypropylene, 200 ml capacity	For details and prices see entries in List No. sequence
	,, ,, 700 ml ,,	
BT-150	**Bottle, reagent,** glass, 250 ml	
BW-544	**Burette,** 10 cm^3, for WR-750 except silver nitrate	
BW-840	**Pinch valve,** for WR-750 and BW-544	
CS-502	**Nessleriser, Lovibond**	
CS-505	**Nessler cylinder,** 50 cm^3	
CS-544	**Nessler disk,** NLF, pH	
CS-612	**Nessler disk,** NOE, O_2 in H_2O	
CS-613	**Nessler cylinder,** modified	
CY-244	**Cylinder,** glass, graduated 50 cm^3 with plastics stopper	
	,, ,, ,, 100 cm^3 ,, ,,	
CY-362	**Cylinder,** acrylic, graduated 10 cm^3	
	,, ,, ,, 25 cm^3	
	,, ,, ,, 50 cm^3	
	,, ,, ,, 100 cm^3	
FP-322	**Funnel,** polypropylene, 9 cm	
HT-520	**Hydrometer jar,** polythene	
PM-104	**Pipette,** bulb, 5 cm^3	
PM-344	**Pipette,** graduated, 1 cm^3	
	,, ,, 2 cm^3	
	,, ,, 10 cm^3	
RV-220	**Rubber teat,** capacity 2·5 ml	
TF-100	**Test tube,** glass, 125 × 12 mm	
TJ-106	**Thermometer,** 30/220°F	
WB-100	**Washbottle,** 250 ml	
	Washbottle, 600 ml	

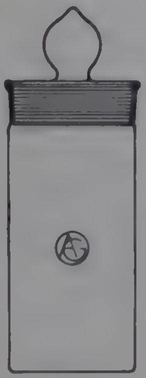
All items on this page normally available from stock.

WEIGHING BOTTLES

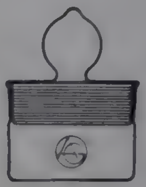
WT-020

WEIGHING BOTTLES, glass, Ⓐ, with ground-in hollow blown stopper. (Nominally interchangeable but not BS joint sizes.)

Height	40	50	60	80	100 mm	
Diameter	20	25	30	40	50 mm	
Dozen	**36/–**	**45/–**	**51/–**	**76/–**	**135/–**	*a*
Each	**4/6**	**5/2**	**5/8**	**7/6**	**12/3**	



WT-020



WT-040

WT-040

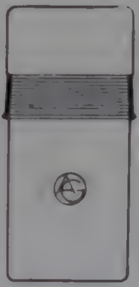
WEIGHING BOTTLES, glass, Ⓐ, squat shape, with ground-in hollow blown stopper.

Height	30	30	30 mm	
Diameter	40	50	60 mm	
Dozen	**98/–**	**116/–**	**160/–**	*a*
Each	**9/–**	**10/6**	**14/6**	

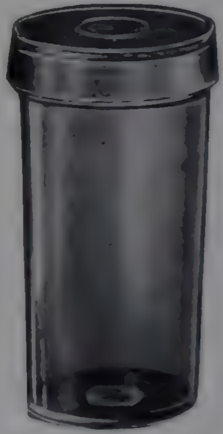
WT-050

WEIGHING BOTTLES, glass, Ⓐ, with flat cap, ground on outside of bottle below the rim.

Height	50	60	70 mm	
Diameter	25	30	40 mm	
Dozen	**45/–**	**64/–**	**88/–**	c
Each	**5/2**	**6/6**	**8/3**	



WT-050



WT-065

WT-060

WEIGHING BOTTLE, polystyrene, transparent and light in weight, with close fitting push-on lid. 50 mm height × 25 mm dia.

Dozen **£0.14. 6.** Each **£0. 2.10.** *m*

WT-065

WEIGHING BOTTLES, strong lightweight polycarbonate with close fitting lid. Can be used in drying ovens up to 110°C.

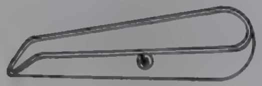
Height	25	50 mm	
Diameter	40	40 mm	
Dozen	**36/–**	**41/–**	*f*
Each	**4/6**	**4/10**	

WT-070

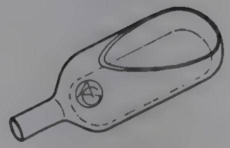
WEIGHING BOTTLE, lightweight polythene, translucent, with close fitting push-on lid. 50 mm height × 25 mm dia. ... Dozen **£0.14. 6.** Each **£0. 2.10.** *m*

GLASS TUBES with snap-on polythene closures suitable for use as weighing bottles or tubes see specimen tubes TW-630 in List No. sequence.

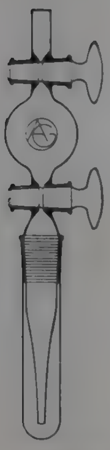
WEIGHING BOTTLES, *Quickfit*	see	QUICKFIT APPARATUS
WEIGHTS, analytical	see	BALANCE WEIGHTS
WIRE, electrical	see	ELECTRICAL APPARATUS
, gauzes	see	GAUZES
, platinum	see	PLATINUM
WOOL, cotton	see	CULTURE APPARATUS
, glass	see	GLASS SUNDRIES



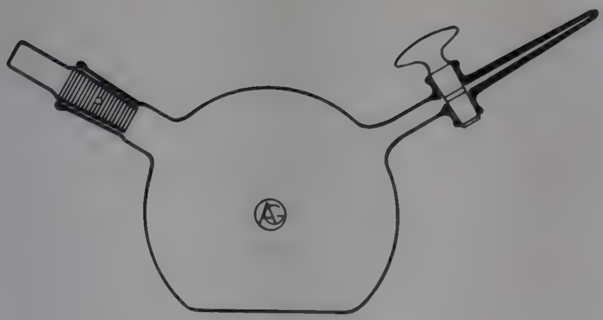
WT-150



WT-170



WT-190



WT-200

WT-150

WEIGHING SCOOPS, glass, (AG).

Length	65	80 mm	
Dozen	**90/–**	**100/–**	*a*
Each	**8/6**	**9/3**	

WT-170

WEIGHING FUNNELS, glass, (AG), for preparation of standard solutions for volumetric analysis. The solid material is weighed in the funnel and then transferred to a volumetric flask by inserting the spout end into the neck of the flask and washing down with solvent from a washbottle. Combines the functions of weighing boat and funnel formerly used for this purpose with improved convenience and accuracy.

Overall length, approx.	60	90 mm	
Body length, approx.	45	65 mm	
Body diameter, approx.	22	35 mm	
Dozen	**62/–**	**78/–**	*a*
Each	**6/4**	**7/8**	

WT-190

WEIGHING PIPETTE, Lunge-Rey, (AG), to BS 2058, for weighing corrosive acids, with reservoir and two straight bore stopcocks, capacity approx. 5 ml.

Dozen **£23. 0. 0.** Each **£2. 2. 0.** *a*

WT-200

WEIGHT BURETTE, borosilicate glass, (AG), capacity 120 ml, for gravimetric titrations, as designed by H. N. Redman, Imperial Chemical Industries Limited, Billingham Division and described in Analyst 1963 Vol. 88 p. 654. Comprises a flat-bottomed container with a filling neck and stopper drilled for admission of air, and a discharge jet and stopcock. The burette weighs between 60 and 80 g. When being weighed before and after titration the weight burette sits firmly on the balance pan on its flat bottom and loss of contents by evaporation is eliminated by the stopper and stopcock. During titration the burette can be supported by a retort ring with the jet pointing vertically downwards as with a volumetric burette.

Dozen **£34. 0. 0.** Each **£3. 2. 0.** *a*

WT-220

LEAD SHOT, for weighing and counterpoising, mixed sizes of nominal diameters 0·5 to 2·5 mm. In polythene pack containing approximately 0·5 kg.

Dozen packs **£6.15. 0.** Pack **£0.12. 3.** *c*

ADDENDA
AND CORRIGENDA

The following pages include items too late for insertion in alphabetical position in the catalogue, together with corrections which have become necessary during the course of printing.

All items on this page normally available from stock.

BOTTLES (page 73). Price and pack qty. corrections.

List No.	Cap. ml	Std. pack qty.	Gross	Std. pack	Dozen	Each
BT-130	30	36	**81/–**	**21/6**	**7/10**	—
BT-130	1000	12	**408/–**	**37/–**	—	**4/6**
BT-150	1000	12	**605/–**	**55/–**	—	**5/10**
BT-152	1000	12	**665/–**	**62/–**	—	**6/4**

CATHETOMETERS. Price corrections.

List No.	Page	Each
CD-420	113	**£115. 0. 0.**
CD-430	113	**£30. 0. 0.**
CD-440	113	**£50. 0. 0.**
CD-450	114	**£270. 0. 0.**

CH-278 (page 129).
CENTRIFUGE HEAD. Withdrawn.

***CH-280** (page 129).
CENTRIFUGE HEAD. Under Model B-35. In column headed 'rev/min' add '35,000'. In column headed 'RCF Xg' add '206,200'. Price correction ... Each **£896. 0. 0.**

CENTRIFUGE TUBES. Price corrections.

List No.	Page	Dozen	Each	
***CJ-012**	131	**30/–**	**4/–**	*m*
***CJ-024**	131	**32/3**	**4/2**	*m*
***CJ-035**	131	**33/3**	**4/3**	*m*
***CJ-055**	132	**38/9**	**4/8**	*m*
***CJ-096**	132	**71/–**	**7/2**	*m*
***CJ-172**	133	**109/9**	**10/–**	*m*
***CJ-212**	133	—	**12/4**	*m*

CK-750 to CK-795 (page 139).
T.L.C. KITS. Suffix correction. For suffix '*m*' read '*f*'.

CL-485 and CL-490 (page 144).
FRACTION COLLECTORS. Illustration corrections.
For caption 'CL-485' read 'CL-490'.
For caption 'CL-490' read 'CL-485'.

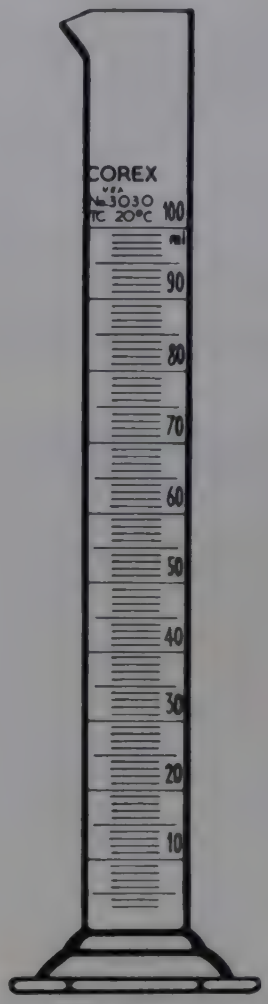
CHROMATOGRAPHS (page 152). Price corrections.

CM-200	Each	**£520. 0. 0.**
CM-205	Each	**£660. 0. 0.**
CM-210	Each	**£730. 0. 0.**
CM-215	Each	**£505. 0. 0.**
CM-220	Each	**£770. 0. 0.**
CM-225	Each	**£760. 0. 0.**
CM-230	Each	**£830. 0. 0.**

CM-555 (page 153).
CLOTH. Renumbered CM-556.
For '31 × 43 cm' read '56 × 40 cm'.
Dozen **£3. 18. 0.** Each **£0. 7. 8.** c

CS-338 (page 162).
LAMP. Price correction ... ... Each **£4. 10. 0.**

CT-084 (page 165).
PLATFORM. Price correction ... Each **£3. 0. 0.**



CY-280

COREX® GRADUATED CYLINDERS

Gallenkamp are appointed exclusive distributors in the United Kingdom of *Corex* products manufactured by the Corning Glass Works, Corning, New York, U.S.A.

Corex® is the trademark given by Corning to laboratory glassware made from a special type of glass and treated by a chemcor ion-exchange process which strengthens the glass chemically so that it becomes many times stronger than ordinary glassware.

Corex® glassware has a much greater surface hardness than ordinary glass and is so better able to resist the scratching and chipping which weaken ordinary glass and are a major cause of breakage, as well as constituting a danger from cross-contamination.

Corex® graduations and inscriptions are as permanent as the glass itself and will remain sharply legible throughout the whole long life of the articles.

Corex® glassware is far more resistant to chemical attack than ordinary borosilicate, will withstand repeated steam sterilisation without visible clouding, and can be used up to 300°C without damage.

Any *Corex* item which becomes unserviceable in normal use within twelve months from date of purchase will be replaced free of charge.

***CY-280**

CYLINDERS, graduated, *Corex* 3030, with permanently marked graduations.

To contain	50	100 cm³	
Subdivided	1	1 cm³	
Pack of 4	**£13. 5. 0.**	**£15. 10. 0.**	*d*
Each	**£3. 10. 0.**	**£4. 2. 0.**	

Items on this page normally available from stock.

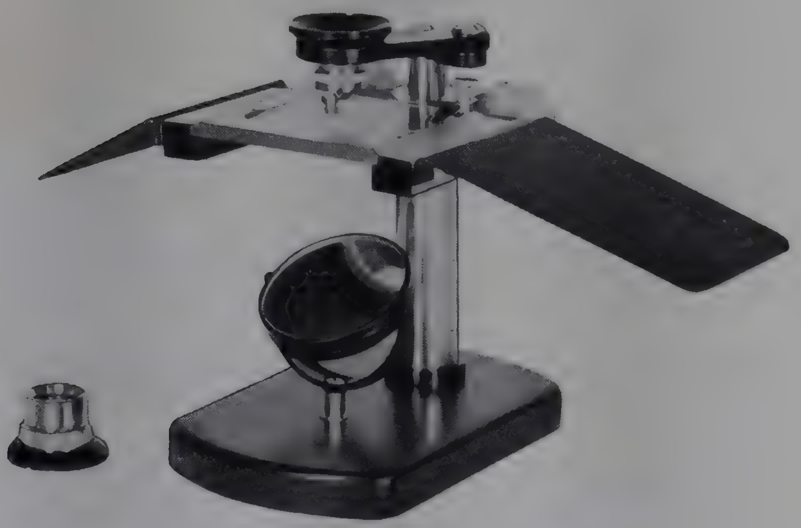
DB-210 (page 186).
PIPETTE. Price correction.
Std. pack **£8.15. 0.** Each **£0. 4. 1.**

DB-220 (page 186).
TEST TUBE. Price correction.
Std. pack **£2. 1. 0.** Each **£0. 7.10.**

OLYMPUS DISSECTING MICROSCOPE

***DR-570**

DISSECTING MICROSCOPE, *Olympus* Model DM-2, with interchangeable ×5 and ×10 achromatic lenses. The cast base carries a vertical column on which are mounted the rack and pinion focussing assembly and the working stage. This square stage 60×60 mm can be used with either the clear glass or the frosted glass plates supplied; it is fitted with slip-on hand rests and with slide clips. The fully adjustable illuminator is provided with a plane and a concave mirror. The lenses are held by a double jointed arm which allows examination of any part of the stage. Complete in wooden case with carrying handle.
Each **£12. 0. 0.** *mS*



DR-570

6
8
10
Analytical Measurements Ltd

EJ-345

ELECTRICAL ACCESSORIES. (page 215).
Price corrections.

List No.	Pack of 5	Each
EB-050	£1.18. 4.	8/9
EB-055	£2. 6. 8.	10/–
EB-060	£2. 0. 0.	8/9
EB-400 5A	£1. 5. 0.	6/2
15A	£1.11. 8.	7/4
EB-430	£1. 0. 0.	5/4

EB-124 Ten pack of 10 **£3.15. 0.** Pack of 10 **£0. 8. 6.**
EB-315 Dozen **£0.13. 0.** Each **£0. 2. 9.**

List No.	Pack of 10	Each
EB-405 5A	£1.10. 0.	4/5
15A	£1.16. 8.	5/2
EB-435	£1.16. 8.	5/2
EB-445	£3.10. 0.	8/2

ED-200 (page 220).
RELAY. Cancelled and replaced by ED-210.

ELECTRICAL INSTRUMENTS. Price corrections.

List No.	Page	Each
EF-200	229	£32. 0. 0.
EF-201	229	£32. 0. 0.
EF-202	229	£32. 0. 0.
EF-203	229	£32. 0. 0.
EF-410	230	£98. 0. 0.
EF-415	230	£98. 0. 0.
EF-450	231	£48. 0. 0.
EF-455	231	£52. 0. 0.
EF-465	231	£60. 0. 0.
EF-600	233	£35. 0. 0.
EF-610	233	£90. 0. 0.

EF-925 (page 235).
OSCILLOSCOPE. Price correction.
Each **£24. 0. 0.**

EJ-086 (page 237).
CONDUCTIVITY CELLS. Price corrections.

	High	Medium	Low
Each	**£10. 0. 0.**	**£11.15. 0.**	**£18. 0. 0.**

EJ-340 (page 241).
pH CONTROLLER. Cancelled and replaced by EJ-345.

pH CONTROLLER
with solid state relay

A bench mounting accessory which must be used **in conjunction with a pH meter** to provide control or alarm in the event of either a rise or fall of pH.

Technical Data

Range	2 – 12 pH
Scale division	0·2 pH
Contact rating	5A
Size	17×14×10 cm
Weight	2·8 kg

EJ-345
pH CONTROLLER, *Analytical Measurements,* for use with EJ-312, EJ-322 and EJ-330. For 200/250V a.c. supplies.
Each **£47. 0. 0.** *f*

EJ-620 (page 244).
pH METER. For '33A' read '38A.

EJ-665 (page 245).
pH METER. Price correction ... Each **£75. 0. 0.**

EJ-682 (page 246).
pH METER. Price correction ... Each **£83. 0. 0.**

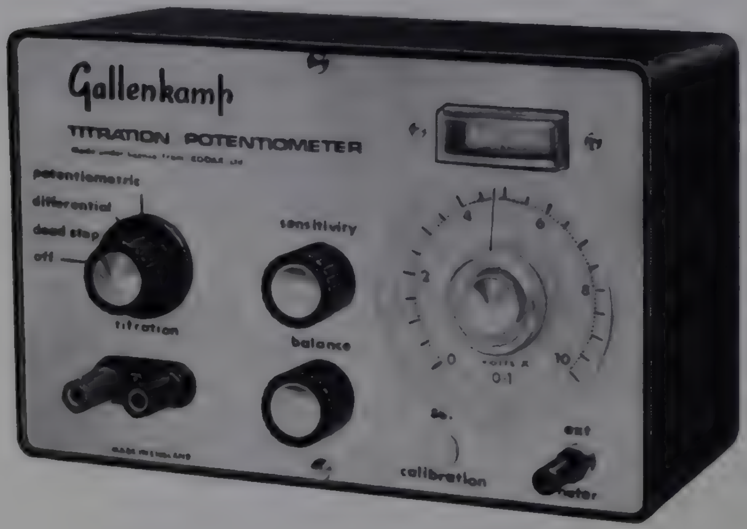
Items on this page coded S normally available from stock.

Gallenkamp TITRATION POTENTIOMETER

Manufactured under licence from Kodak Ltd.

A versatile robust potentiometer for routine industrial and educational applications where the use of glass electrodes is not necessary or desirable.

- **Suitable for potentiometric, differential or dead-stop titrations**
- **Transistor circuit suitable for all except glass pH electrodes**
- **Very stable performance—long battery life**
- **Simple to operate, calibration adjustment provided**
- **Sensitive moving coil null meter**



EJ-890

PERFORMANCE AND OPERATION

This self contained, battery operated, portable potentiometer has been proved by years of industrial operation. Based on a sensitive transistor circuit, the instrument has an input impedance high enough to suit most common electrodes with the exception of glass pH electrodes. The potentiometer dial is calibrated from 0 to 1V in 10 mV subdivisions and out of balance voltages of only 2 mV are detected. A single switch selects the type of titration function required and controls are fitted for potentiometer calibration, the out of balance detector sensitivity and null point. A socket is provided for connecting an external meter of higher sensitivity than that of the built-in meter.

CONSTRUCTION AND DIMENSIONS

The null meter, controls, printed circuit and batteries are housed within a strong die-cast aluminium alloy case. The unit is equally suitable for horizontal or vertical operation.

	H	W	D
Dimensions	12 ×	19 ×	10 cm
Weight	1·0 kg		

EJ-890

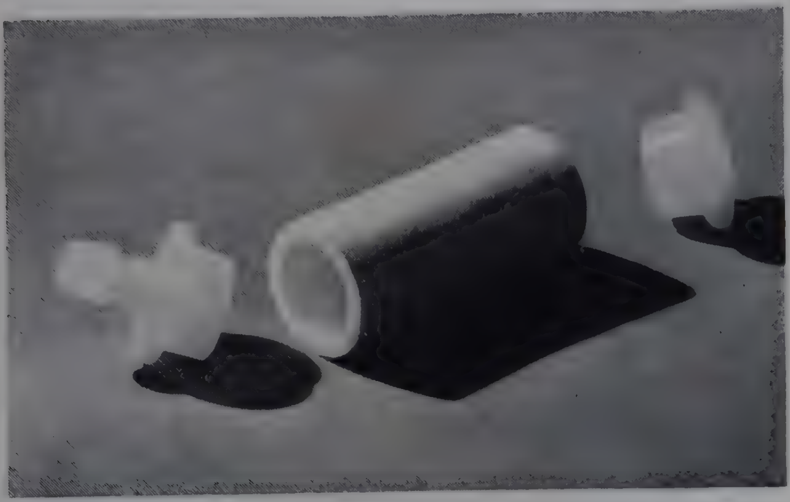
TITRATION POTENTIOMETER, *Gallenkamp*, transistorised, as specification, range 0 to 1V, with built-in null meter and three batteries, *Mallory* Type Mn 1400.

Each **£18. 10. 0.** *b*

ACCESSORIES

EF-490	**Battery, voltage reference,** *Mallory*, for potentiometer calibration	For details and prices see entries in List No. sequence.
EJ-540	**Electrode,** reference	
EJ-550	**Electrode,** platinum	
EJ-552	**Electrode,** tungsten	
EJ-556	**Electrode,** antimony	
EJ-558	**Electrode,** silver	
EJ-920	**Titration stand assembly,** unheated	
EJ-925	**Titration stand assembly,** heated	
SS-626 et seq.	**Magnetic followers,** glass, polypropylene and PTFE encased	

All items on this page normally available from stock.



FC-640
FC-642

EJ-930 (page 251).
POTENTIOMETRIC MICROTITRATION APPARATUS. Add the following to components list:—
SM-635 Bosshead. SM-680 Spring clamp 20 mm.

Price correction:—
220/240V ... ... Each **£139.10. 0.** *g*
200/210V ... ... Each **£140.10. 0.** *gN*
100/120V ... ... Each **£140.10. 0.** *gN*

EJ-938 (page 251).
SILVER WIRE. Price correction. Each **£0. 5. 6.**

KARL FISCHER APPARATUS. Price corrections.

List No.	Page	Each	
EJ-960	252	**£145. 0. 0.**	*fN*
EJ-962	,,	**£1. 3. 0.**	*fN*
EJ-964	,,	**£3. 5. 0.**	*fN*
EJ-966	,,	**£3.17. 6.**	*fN*
EJ-967	,,	**£3.17. 6.**	*fN*
EJ-972	,,	**£1.15. 6.**	*fN*
EJ-973	,,	**£3. 0. 0.**	*fN*

FC-315 (page 265).
FILTER PAPER. Cancelled. Delete references to Grade 544 on pages 263 and 264.

FC-512 (page 266).
FILTER PAPER. Price correction.

Diameter	12·5	15	18·5	24	32	40	50 cm	
Box of 100	7/7	9/2	12/–	17/–	26/6	37/6	52/–	*d*

WHATMAN GLASS FIBRE FILTER TUBES

Designed for filtration and clarification of bulk quantities of liquids such as acids and solvents in Winchester bottles or carboys. These tubes provide 98% retention of 2 μm particles, are made of resin reinforced glass fibres and are resistant to most common acids, alkalis and organic solvents up to 160°C. Supplied in packs containing ten tubes complete with one each polypropylene end cap and connector.

List No.		FC-640	FC-642	
Size No.		A1	B2	
Diameter, external	mm	15	25	
internal	mm	12	19	
Length	mm	60	60	
Flow rate, water with 15 cm Hg suction,	litres/min	>0·7	>1·4	
Average capacity solids before clogging,	mg	50	200	
Pack		**23/–**	**40/–**	*d*

FD-255 (page 271). **VALVE.** Price correction.
Dozen **£1.19. 9.** Each **£0. 4. 9.** *m*

METAL FILTER HOLDERS (page 274).
Specification, price and code corrections.
Delete *Gallenkamp*, feature 'Polished stainless steel filter support' and sentence 'The disk is polished ——— a wire gauze'.
For 'nickel-silver alloy' read 'brass'.
For 'perforated stainless steel disk' read 'silver-plated brass gauze'.

FD-420. Withdrawn and replaced by:

FD-421
FILTER HOLDER, 20 ml, as specification, for vacuum filtration, to take 3·6 cm dia. filter sheets.
Each **£5.16. 0.** *m*

FD-425. Withdrawn and replaced by:

FD-426
FILTER HOLDER, 80 ml, as specification, for vacuum filtration, to take 6 cm dia. filter sheets.
Each **£8.15. 0.** *m*

FD-430. Withdrawn and replaced by:

FD-431
FILTER HOLDER, as FD-426, but for vacuum or pressure filtration ... ... Each **£10. 5. 0.** *m*

Illustrations FD-420, FD-425 and FD-430 obsolete. Appearance of FD-421, FD-426 and FD-431, particularly with regard to clamping arrangement, is similar to illustration of FD-465 on page 275.

FD-465 (page 275). Renumbered FD-466.
For '750 ml' read '700 ml'.
For 'gunmetal' read 'brass'.
For 'stainless steel perforated disk' read 'silver-plated brass gauze'.
Delete sentence 'Experiment has shown ——————— clean and sterilise'.
Price and code correction ... ... Each **£31. 0. 0.** *f*

GD-556 and GD-558 (page 385).
FLOW REGULATOR and **FLOWMETER.** Cancelled and replaced by combined assembly GD-557.

GD-557
FLOW REGULATOR, similar to GD-556 but fitted with flowmeter range 2 to 15 litres/min and fine adjustment valve ... ... Each **£16.10. 0.** *m*

Items on this page normally available from stock except those coded *N*.

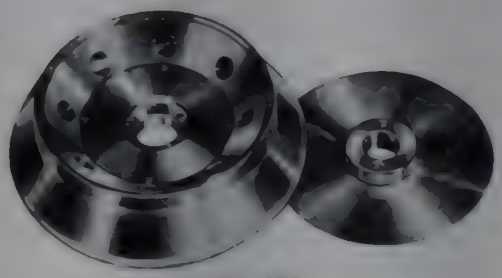
INTERNATIONAL MODEL MB MICRO-HAEMATOCRIT CENTRIFUGE

For the micro capillary method of blood cell volume testing and for microchemical determinations.

- **Speeds up to 15,000 rev/min**
- **Quiet running with rapid braking**
- **Four interchangeable heads available**

MD-070

The controls comprise a timer switch and an electric brake push-button. Rotation of the timer causes the centrifuge to start and to continue running until the set time has elapsed. It then switches off and the bell sounds to call the operator. When the electric brake is applied the head is retarded from full speed to dead stop in 15 seconds. Cooling air is drawn in through the cover port and exhausted through a filtering port in the rear. Net weight 10 kg (22 lb). Dimensions 25 × 28 × 23 cm high (10 × 11 × 9 in high).



MD-075

***MD-070**

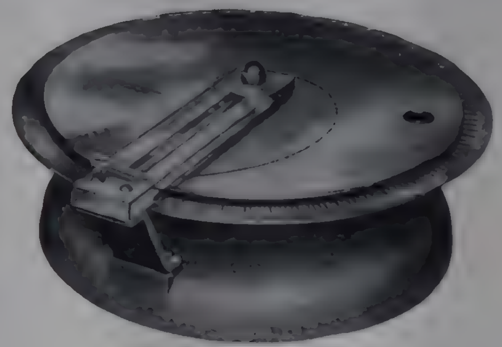
CENTRIFUGE, MICRO-HAEMATOCRIT, *International*, as specification, complete with head holding 24 capillary tubes 75 mm × 1·75 mm diameter in numbered positions. For 230V 50/60 Hz supplies.
Each **£77. 0. 0.** f

ACCESSORY HEADS

***MD-073** **Head,** for holding 8 capillary tubes 75 mm × 1·75 mm diameter and 8 capillary tubes 75 mm × 9 mm diameter. Numbered positions... ... ... Each **£33. 0. 0.** f

***MD-074** **Head,** for holding 24 capillary tubes 34 mm × 1 mm diameter. Numbered positions ... Each **£20. 0. 0.** f

***MD-075** **Head,** for holding eight 1 ml plastics tapered tubes. Numbered positions ... ... Each **£27. 0. 0.** f



MD-078

OTHER ACCESSORIES

***MD-078** **Micro-capillary tube reader,** circular.
Each **£20. 10. 0.** f

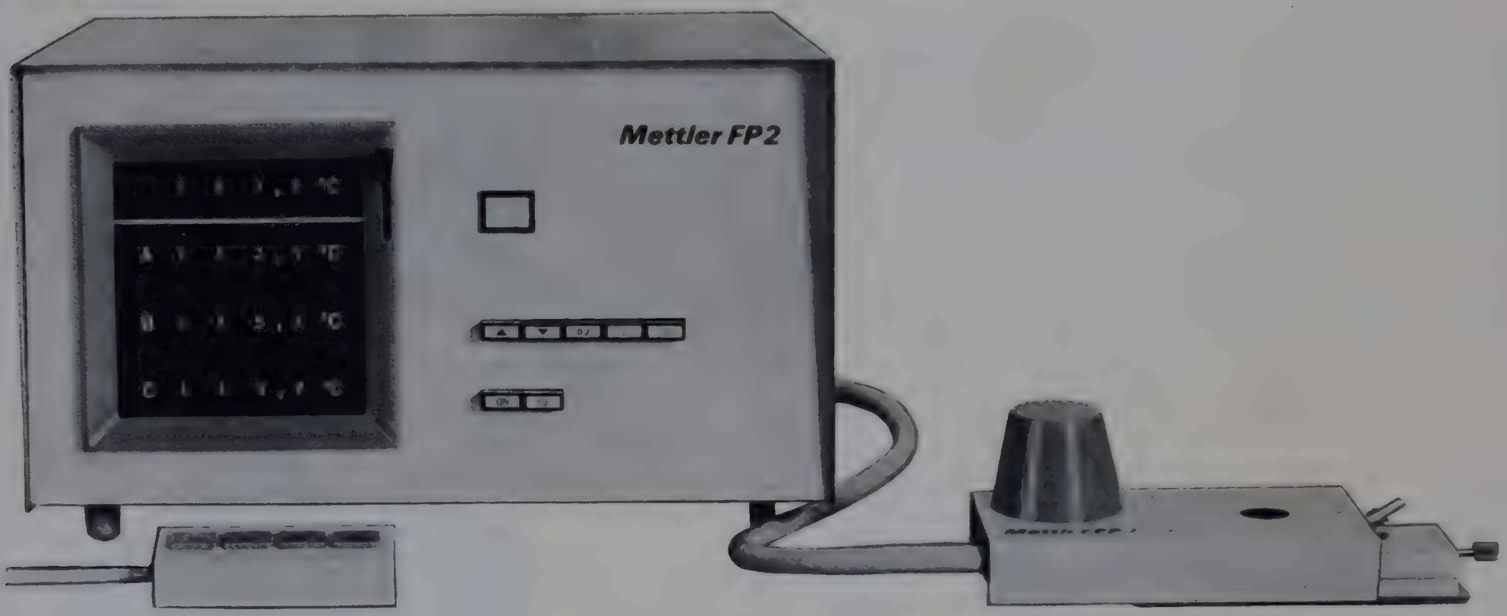
***MD-080** **Micro-capillary tube reader,** linear, with built-in illuminator. For 230V 50 Hz supplies.
Each **£45. 10. 0.** f

MD-080

METTLER MICRO-MELTING POINT APPARATUS
MODEL FP2

Permits thermomicroscopic investigations to be carried out without the operator's attention being distracted by the need to control the rate of rise of temperature, to read a thermometer or to write down results.

- **Determination of micro-melting points**
- **Determination of eutectic temperatures**
- **Investigation of polymorphous substances**
- **Thermal analyses by contact method**
- **Provides uniform temperature field pattern of the micro hot stage**
- **Fully automatic temperature control**
- **Precise temperature measurement**
- **Digital indication of three successive temperatures**
- **Fully transistorised circuitry**



MF-460

CONSTRUCTION

The apparatus comprises three modules:

Hot stage. This is constructed in two parts so that samples are heated simultaneously from above and below. It may be fitted to any standard microscope with either fixed or sliding stage. The heating plates incorporate a platinum resistance thermometer used for temperature measurement and a heat filter to protect the microscope objective. Built in to the hot stage is a compact air blower which prevents the outer walls of the stage from becoming too hot and provides rapid cooling at the end of a test.

Controller. Contains digital temperature indicators and push-button controls for temperature programme. Rapid initial heating and final cooling controls are alongside push-button selectors for 0·2°C/min, 1, 2 or 3°C/min and 10°C/min heating programmes. The linearity of the programme selected is strictly monitored and governed by electronic systems within the controller. Readout is stored and indicated digitally to an accuracy of 0·1°C. The counters are automatically zeroed at the commencement of the next test so that they cannot be arbitarily or accidentally cancelled.

Push-button station. Each time the operator observes a change and wishes to record the temperature at which it occurred, he has merely to press one of the three buttons, labelled A, B and C, on this station and the accurate temperature comes up on the controller, ready to be noted at the end of the test. In this way the operator needs neither to read a temperature indicator nor to write down the result while his concentration is focused on observing the sample. A fourth button is provided which arrests the temperature programme and allows isothermal observations to be made at any time.

METTLER MICRO-MELTING POINT APPARATUS MODEL FP2

(Continued)

PERFORMANCE DATA

Temperature range	−20 to +300°C (investigations below ambient temperature require a refrigerating chamber)
Heating rates	0·2; 1, 2 or 3; 10°C/min linear
Accuracy of hot stage temperature (on 0·2°C/min rate and isothermal)	±0·1°C between 30 and 100°C ±0·2°C between 100 and 200°C ±0·3°C between 200 and 300°C
Readability	0·1°C digital step

DESIGN DATA AND DIMENSIONS

Sample recess (prismatic)	45×30×2 mm
Sample carrier (trimmed)	76×19×1 mm
Cover glass	15×15×0·2 mm
Field of vision	2·5 mm diameter
Sample/objective clearance	7·0 mm
Stage/objective clearance	29 mm
Admissible ambient	−20° to +40°C
Controller	36×38·5×21·5 cm high
Hot stage	19·5×8·5×2·8 cm high (height of blower 4·8 cm)
Length of connecting cable	100 cm
Power supply	110, 125, 145, 160, 220 and 240V a.c.
Admissible voltage fluctuation	±10%
Power consumption	90W
Weight, net	15 kg (33 lb)

***MF-460**

MICRO-MELTING POINT APPARATUS, *Mettler* Model FP2, comprising hot stage, controller and push-button station, as specification. Includes two sets of 50 sample carriers and cover glasses, cooling vane, protective heat filter, replacement fan motor, 3 each fuses 1A and 6·5A, 2 indicator lamps and dust cover.

Each **£385. 0. 0.** *m*

OXIDATION TEST (page 602).

Delete ASTM D1314.

PF-570 (page 602)

GLASSWARE Withdrawn and replaced by

PF-575

GLASSWARE, for PF-560, comprising pressure regulator, air bleed tube and four each flasks, condensers and air inlet tubes. ... ... Set **£20. 0. 0.** *f*

Add new item

PF-577

PRESSURE COMPENSATOR, glass, complete with inlet tube and stopper ... ... Each **£3. 10. 0.** *f*

BRITISH STANDARDS

The British Standards Institution is the national standardising body of the U.K. The standards which it publishes represent the results of collaboration between a wide range of interests including users, technical and scientific experts and manufacturers.

The BSI maintains close contact with many overseas standardising bodies both by interchange of information and by direct representation through the medium of ISO (International Organisation for Standardisation). Many British Standards, particularly those revised in recent years reflect the influence of international requirements.

Any article made to a British Standard is one on which the purchaser or user can rely as being satisfactory for its intended general use. The BS requirements must be such as will satisfy the majority of users and manufacturers, otherwise the standard will not receive general recognition.

The discerning purchaser will not only require goods made to the appropriate BS but will also recognise that within the framework of a standard a variation of finish and quality is possible and that it is still as important as ever to purchase from a source with a known reputation for high quality.

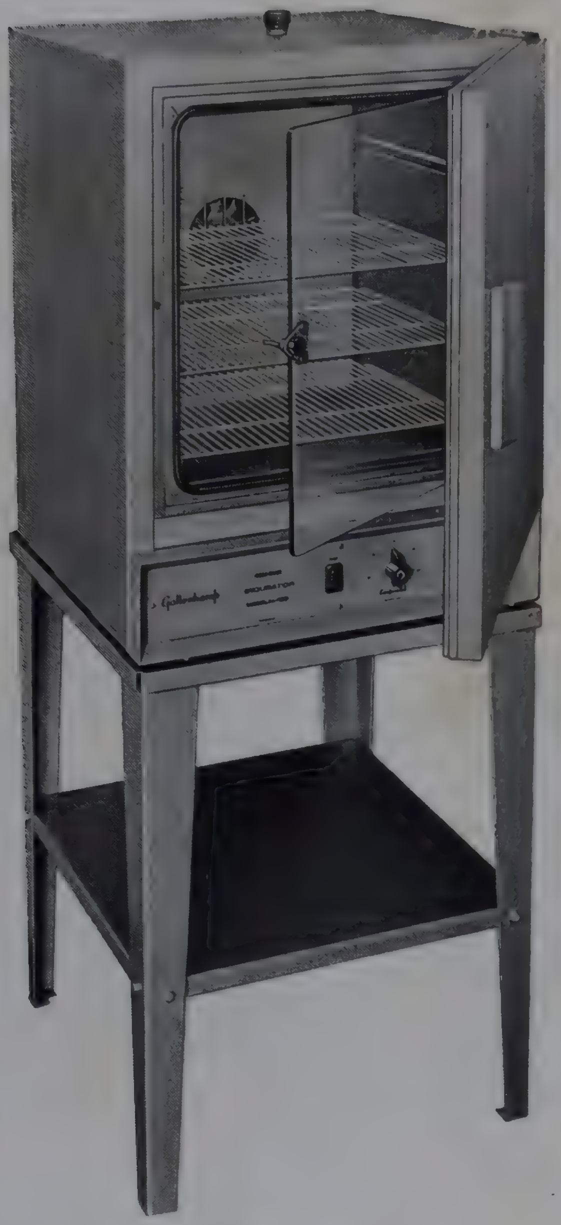
The name *Gallenkamp* has been known in laboratories throughout the world for more than three quarters of a century. *Gallenkamp* products bearing one of the five registered trade marks, *Gallenkamp, Technico, Compenstat,* Ⓐ or *Asda* can be relied upon to provide the highest quality at an economic price.

All items on this page normally available from stock.

Gallenkamp OVEN AND INCUBATOR STANDS

A range of rigid steel floor stands designed to provide a comfortable working height for *Gallenkamp* ovens and incubators. With fixed support platform and convenient undershelf for samples, etc.

Supplied in pre-pack with instructions for assembly.



IH-100 with OV-480

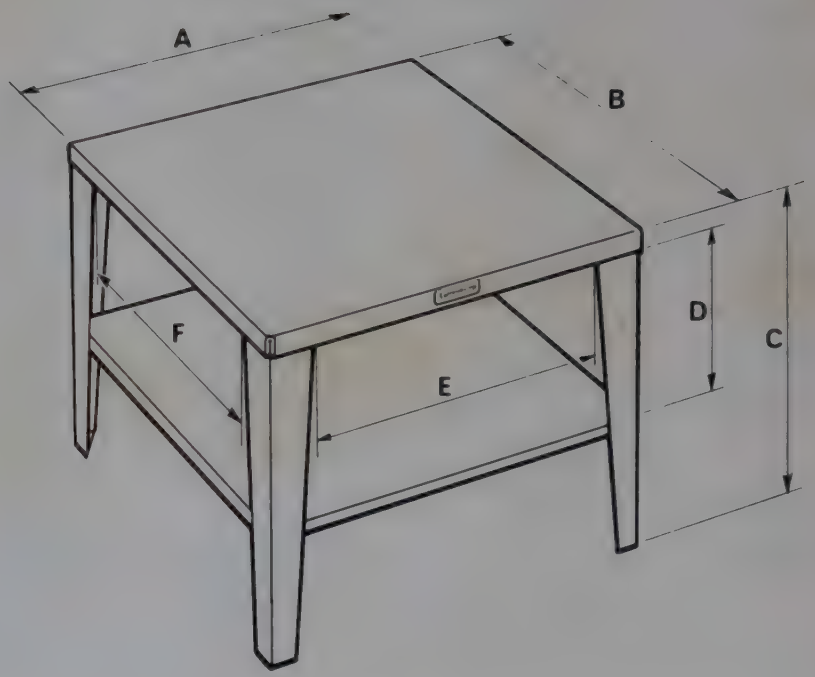


Fig. 1

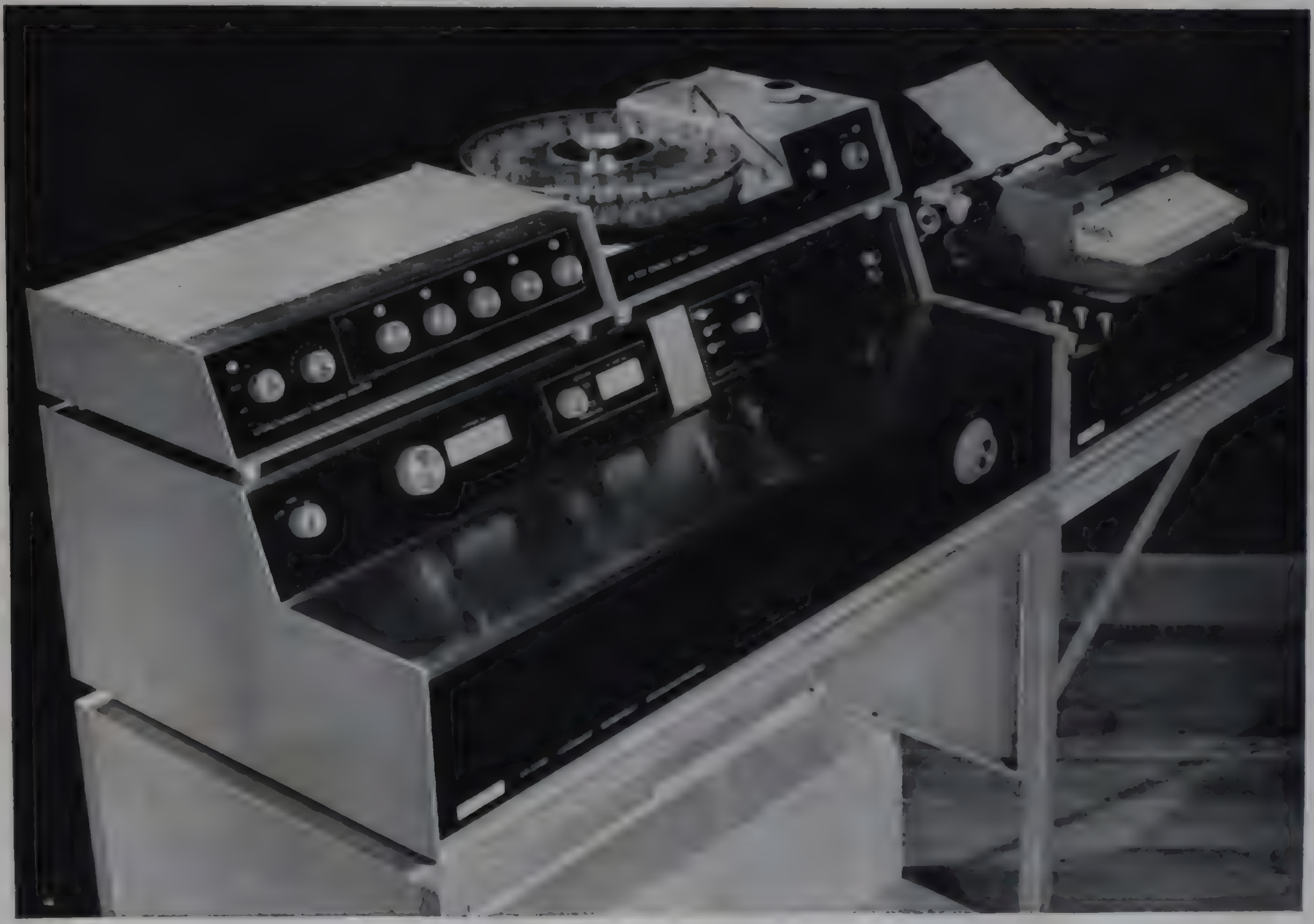
List No.	Suitable for		Dimensions (refer to Fig. 1)						Each	
	List No.	Size	A	B	C	D	E	F		
OV-480	IH-100 OV-060 and OV-062 OV-160 and OV-165 OV-330 and OV-335	No. 1 No. 1 No. 1	57 22½	57 22½	70 28	36·5 14½	40 16¼	40 cm 16¼ in	£13. 0. 0.	*b*
OV-482	IH-100 IH-150 OV-010 OV-160 and OV-165 OV-330 and OV-335	No. 2 No.'s 1 and 2 No.'s 1 and 2 No. 2 No. 2	67 26½	67 26½	63·5 25	34 13	51 20¼	51 cm 20¼ in	£14. 5. 0.	*b*
OV-484	IH-100 OV-160 OV-165 OV-420 and OV-425 OV-440 and OV-445	No. 3 No. 3 No. 3	77 30½	67 26½	56 22	29 11½	62 24¼	51 cm 20¼ in	£15.10. 0.	*b*

All items on this page normally available from stock.

SP.3000 SPECTROPHOTOMETER

175-750 mμ with nitrogen flushing

An automatic, high accuracy, quantitative spectrophotometer.



SL-618

- **Unique photometric system**
- **Photometric reproducibility better than ±0·001A**
- **Integral digital display or serialised print-out**
- **Automatic sampling with indexing of samples**
- **Operator error eliminated**

This instrument makes use of an auxiliary radiation standard to maintain calibration thus ensuring very high photometric accuracy and reproducibility. The complete SP.3000 system may be used to measure automatically the absorbence of up to fifty samples at ten pre-selected wavelengths, and print out the results digitally. Operation is rapid and operator errors are completely eliminated.

TECHNICAL DATA

The Littrow monochromator incorporates a 30° silica prism. The mode of operation is single beam with automatic source change and with automatic sample and reference interchange.

Wavelength range	175–750 or 850 mμ
accuracy	±0·2 mμ at 200 mμ ±0·4 mμ at 320 mμ ±1·5 mμ at 500 mμ
Reproducibility	±0·1 mμ at 200 mμ ±0·2 mμ at 320 mμ ±0·7 mμ at 500 mμ
Photometric linearity	Better than ±0·1%T or ±0·001A over range 0·000–0·800A
Photometric reproducibility	Less than ±1 in least significant digit in the readout over most of the photometric range
Stray light	Better than 0·1% over most of range down to 196 mμ
Resolution	0·5 mμ–2·0 mμ over range
Presentation	Digital display or print-out with sample indexing. Switched absorbance or percent transmission
Power supplies	Integral for line operation 110/260V, 50 or 60 Hz

For ordering specification and accessories see overleaf.

SP.3000 SPECTROPHOTOMETER

(continued)

SL-618

SPECTROPHOTOMETER, Unicam, SP.3000, as specification, complete with tungsten lamp and deuterium arc lamp, photomultiplier, integral power supplies, illuminated digital display, two stoppered silica cells in case, standard cell holder, dust cover for main instrument, and operating manual ... ... Price on application. *f*

ACCESSORIES

SL-621 **Digital print-out accessory SP.3001,** complete with serialiser and special typewriter Price on application. *f*

SL-622 **Automatic sample changer, SP.3002,** capacity fifty samples ... ... Price on application. *f*

SL-623 **Automatic wavelength selector, SP.3003** for five wavelengths ... ... Price on application. *f*

SL-624 **Automatic wavelength selector extensions unit, SP.3013** ... ... Price on application. *f*

SL-625 **Programme timer, SP.3005** ... Price on application. *f*

SL-626 **Trolley, SP.3010** ... ... Price on application. *f*

MAGNETIC STIRRER WITH THERMOSTATICALLY CONTROLLED HOTPLATE

- **Control temperature range 40 to 300°C**
- **10 stirring speeds to 1325 rev/min**
- **Provides optimum control of heating and of stirring simultaneously**

SS-618 with rod

SS-618

MAGNETIC STIRRER/HOTPLATE, *Gallenkamp*, as specification with adjustable hydraulic **thermostatic control,** aluminium hotplate, enclosed heater and silent stirrer motor. Supplied with one each 25 and 45 mm magnetic followers enclosed in polypropylene but **without rod.**

For 200/250V 50 Hz single phase supplies.
Each **£23. 10. 0.** *bs*

For 110/120V 60 Hz single phase supplies.
Each **£24. 0. 0.** *b*

When ordering please state voltage and nature of supply.

For suitable rods see SM-420, SM-422 and SM-424 in List No. sequence.

REPLACEMENT PART

SS-617 **Hotplate**, 400W. For price see entry in List No. sequence.

When ordering replacement part please state serial No. of stirrer and supply voltage.

SOLENOID VALVE

SOLENOID VALVE TYPE
INLET

ST-760

ST-760

VALVE, solenoid, electrically operated, for ON/OFF control of flow of liquids at pressures up to 5 lbf/in^2 (0·35 kgf/cm^2). A packless, **normally closed** type suitable for temperatures up to 37°C. The robust valve body and all functional parts are of PVC and PTFE making it suitable for handling a wide range of acids, alkalis, inorganic and organic chemicals and biological fluids. Polypropylene inlet and outlet nozzles, suitable for 12·7 mm bore flexible tubing, are provided. Surge current 1·75A; running current 0·23A. For 220/240V 50 Hz single phase supplies... ... Each **£13. 0. 0.** *mS*

Items on this page coded *S* **normally available from stock.**

Gallenkamp GENERAL PURPOSE WATER BATH

70 LITRE CAPACITY

For laboratory applications in which constant temperature and rapid heat transference to samples are required.

- **Temperature control by contact thermometer**
- **Stainless steel interior**
- **Accessories include cover, cooling coil and tube racks**

WF-470 with WF-476

PERFORMANCE AND CONTROLS

Temperature range	ambient +5°C to 95°C (with cover)
Temperature fluctuation	±0·1°C (with water)
Temperature variation	0·2°C

NOTES:

1. For use above 50°C with water the gabled cover should be used to minimise evaporation.
2. For use at or below ambient temperatures the cooling coil and a supply of cold water are necessary.

The 0–100°C contact thermometer mounted in its protective housing, the tubulure for an indicating thermometer and the control compartment for the transistorised relay are grouped at one end of the bath. A three heat switch with OFF position and mains and load indicator lamps are fitted. The three heat switch enables the power input to the bath to be set to 500, 1000 or 2000 watts to provide the optimum heating rate at any control temperature.

CONSTRUCTION AND DIMENSIONS

The interspace between the stainless steel interior and the grey stoved enamel finished outer case is filled with high efficiency fibre glass insulation. Two metal sheathed heaters are mounted just above the floor of the bath. A perforated stainless steel shelf is fitted, the height of which can be adjusted in 2·5 cm steps to give working depths of between 24 and 9 cm measured from the top of the bath wall.

	H		W		D
Overall dimensions	32	×	84	×	56 cm
	12½	×	33	×	22 in
Internal dimensions	28	×	61	×	46 cm
	11	×	24	×	18 in
Heater rating			2000 W		

WF-470

WATER BATH, *Gallenkamp,* **70 litre capacity, stainless steel,** as specification, temperature controlled by contact thermometer up to 95°C max. With adjustable shelf but **without accessories.** For single phase a.c. supplies only.

For 220/240V	Each	**£90. 0. 0.**	*b*
For 200/210V	Each	**£90. 0. 0.**	*bN*
For 110/120V	Each	**£90. 0. 0.**	*bN*

When ordering please state voltage and nature of supply.

REPLACEMENT PARTS

WF-472	**Heater, 1000W, inner**	Each	£4. 18. 0.	*b*
WF-474	**Heater, 1000W, outer**	Each	£5. 12. 0.	*b*
TM-866	**Contact thermometer, 0–100°C.** For price see entry in List No. sequence.			

When ordering replacement parts please state serial number of water bath and supply voltage.

ACCESSORIES

WF-476	**Cover, gabled,** stainless steel ...	Each	£14. 12. 6.	*b*
WF-460	**Constant level device**	For details and prices see entries in List No. sequence.		
IH-392	**Cooling coil**			
TJ-440	**Thermometer, 0 to 110°C, 1°C sub-divisions**			
WF-380	**Spheres, polypropylene,** to minimise evaporation and heat losses. 5 packs required.			

RACKS FOR WATER BATH WF-470

WF-386	**Rack,** for serological tests to hold thirty-six 75 × 12 mm tubes, with holes numbered 1 to 36	For numbers of racks which can be accommodated and prices see entries in List No. sequence.
WF-388	**Rack,** for serological tests, adjustable in height to hold thirty-six tubes, from 38 mm to 90 mm long and up to 12 mm dia., with holes numbered 1 to 36	
WF-390	**Rack,** for methylene blue and resazurin tests, to hold ten tubes 150 × 16 mm, with holes numbered 1 to 10	
WF-392	**Rack,** general purpose, to hold twenty-four tubes 150 × 16 mm ...	
WF-394	**Rack,** general purpose, to hold sixteen tubes 150 × 25 mm	

Items on this page normally available from stock except those coded *N*.

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